Pi OF THE CIRCLE

VOL-V

π

By

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VINAYGRAPHICS, BALAJI COLONY, TIRUPATI

Dedicated humbly

to

PYTHAGOREAN HIPPASUS OF METAPONTUM

Greece

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THE NEW THEORY OF THE ONENESS OF SQUARE AND CIRCLE

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ABSTRACT

Originally, Pi constant was understood as the ratio of circumference of a circle to its diameter. As the length of the circumference could not be measured due to its curvature, Exhaustion method was adopted for many centuries, where in, regular polygon are inscribed in a circle and also circumscribed about a circle. The lengths of the perimeter of the polygons is attributed to the circumference of the circle, applying the concept of limit. From 1450 AD onwards Infinite series has been the mode of computation of Pi. In this paper a new approach is adopted and Pi value derived, going back again, to the pre-1450 period of geometrical approach.

KEYWORDS: Algebraic number, area, circle, circumference, diagonal, diameter, length, rectangle, side, square.

INTRODUCTION

This paper stands on the new theory of the **oneness** of square and circle. The length of the circumference πd of the inscribed circle, is applied to the different line segments such as, side and diagonal of the square. The side is independent of π, whereas the diagonal is **not** independent of π. This has made possible, to derive, the real π value.

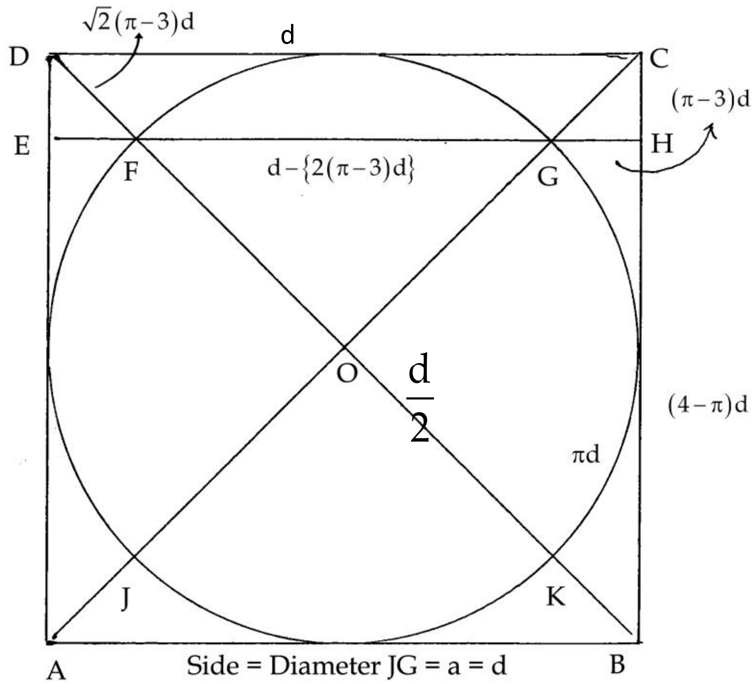
PROCEDURE

1. Square : ABCD
2. Circle : Side of the square = Diameter of the circle = a = d
3. Diagonal = $\sqrt{2}\mathrm{d}$
4. Triangle FOG : OF = OG = $\frac{\mathrm{d}}{2}$

   Hypotenuse = FG = OF x $\sqrt{2}$ = $\sqrt{2}\times\frac{\mathrm{d}}{2}$ = $\frac{\sqrt{2}\mathrm{d}}{2}$
5. Parallel side = EH = a = d
6. DE = EF = GH = CH = $\frac{\mathrm{EH}-\mathrm{FG}}{2}$ = $\left(\mathrm{d}-\frac{\sqrt{2}\mathrm{d}}{2}\right)\frac{1}{2}=\left(\frac{2-\sqrt{2}}{4}\right)\mathrm{d}$

Part-II

7. **Let us suppose, CH = (π – 3) d,** then the other line segments of the square get the following, in terms of π, when the circumference is πd (Proof S.No. 21)
8. FG = d – $\left\{2\left(\pi-3\right)\mathrm{d}\right\}$ = $\frac{\sqrt{2}\mathrm{d}}{2}$
9. Corner lengths AJ, CG, KB, and DF = $\sqrt{2}\left(\pi-3\right)\mathrm{d}=\left(\frac{\sqrt{2}-1}{2}\right)\mathrm{d}$
10. JG = diameter = d



d

11. CH = $(\pi-3)d=\left(\frac{2-\sqrt{2}}{4}\right)d$
12. HB = $(4-\pi)d=\left(\frac{2+\sqrt{2}}{4}\right)d$

Part-III

13. Circumference = $\pi d = 3d + (\pi-3)d$
14. Sides of the ABCD square are independent of π
15. Side EH = EF + FG + GH = d =
$$(\pi-3)d+d-\{2(\pi-3)d\}+(\pi-3)d=d$$
16. Side BC = CH + HB = d = $(\pi-3)d + (4-\pi)d = d$
17. Perimeter of the ABCD square = 4d
    = BA + AD + DC + CH + HB = 4d
    = d + d + d + $(\pi-3)d + (4-\pi)d = 4d$
18. The diagonals of ABCD square, are not independent of π. Hence, the derivation of the real π value has become possible.
19. Diagonal AC = $\sqrt{2}d$
    = Corner length + diameter + corner length
    = AJ + JG + GC = $\sqrt{2}d$
    = $\sqrt{2}(\pi-3)d+d+\sqrt{2}(\pi-3)d = \sqrt{2}d$
    = $2\sqrt{2}(\pi-3)d+d=\sqrt{2}d$

$$\therefore \pi = \frac{14-\sqrt{2}}{4}$$

20. It is clear, therefore, that the assumption that CH length is equal to $(\pi - 3)d$ of $3d + (\pi - 3)d$ of circumference in S.No. 7 is real.
21. **Proof for CH = (π – 3)d and HB = (4 – π)d**
The length of the circumference of the **inscribed** circle is πd. Circle is inside the square.

The perimeter of the ABCD square is 4a = 4d
The length of the circumference is thus shorter than the length of the perimeter of the ABCD square. And hence, **to equalize** both, let us do the following:

πd + x = 4d,
where x is unknown
x = 4d – πd = (4 – π)d

We know, that the BC side of the ABCD square is equal to a = d, then,

Side – x = y
= d – x = y
y = d – (4d – πd), where x = (4 – π)d
So, y = (π – 3)d

The BC side of ABCD square is equal to d, and is divided **naturally** into CH and HB line segments. In the above process too, we have two values, one for x and another one for y.

Further, one line segment is longer and another line segment is shorter. In the above process x line segment is longer and y line segment is shorter. So, we can **match** x with HB longer line segment, and y with CH shorter line segment.

HB = x = (4 – π) d and
CH = y = (π – 3) d

SECOND PROOF IN TERMS OF AREA

ABCD square can be divided into two rectangles.
(1) DEHC and (2) EABH

1. **Area of DEHC rectangle**

$$\text{DE side} = \left(\frac{2-\sqrt{2}}{4}\right)d$$

EH side = d

$$DE \times EH = \left(\frac{2-\sqrt{2}}{4}\right)d \times d = \left(\frac{2-\sqrt{2}}{4}\right)d^2$$

2. **Area of EABH rectangle**

$$\text{EA side} = \left(\frac{2+\sqrt{2}}{4}\right)d$$

AB side = d

$$EA \times AB = \left(\frac{2+\sqrt{2}}{4}\right)d \times d = \left(\frac{2+\sqrt{2}}{4}\right)d^2$$

3. **In terms of π**

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Area of DEHC rectangle $=\left(\dfrac{32\pi-96}{32}\right)d^2$

Area of EABH rectangle = $\left(\dfrac{128-32\pi}{32}\right)d^2$

Area of ABCD square = $\left(\dfrac{32\pi-96}{32}\right)d^2+\left(\dfrac{128-32\pi}{32}\right)d^2=d^2$

Finally, to sum up

4. **By length, CH**

$$CH=(\pi-3)d=\left(\frac{2-\sqrt{2}}{4}\right)d \qquad \therefore \pi=\frac{14-\sqrt{2}}{4}$$

By area, rectangle DEHC

$$\left(\frac{32\pi-96}{32}\right)d^2=\left(\frac{2-\sqrt{2}}{4}\right)d^2 \qquad \therefore \pi=\frac{14-\sqrt{2}}{4}$$

5. **By length, HB**

$$HB=(4-\pi)d=\left(\frac{2+\sqrt{2}}{4}\right)d \qquad \therefore \pi=\frac{14-\sqrt{2}}{4}$$

By area, rectangle EABH

$$\left(\frac{128-32\pi}{32}\right)d^2=\left(\frac{2+\sqrt{2}}{4}\right)d^2 \qquad \therefore \pi=\frac{14-\sqrt{2}}{4}$$

Either in terms of length or in terms of extent of area, one π value comes ultimately, hence, this is the **true** π value. If π is equal to the official value 3.14159265358, both length and area of rectangles get nullified or cancelled. So, any value for π in between 3 and 4 appears correct, because the length of the side, BC of ABCD square is **independent of π, but not, when the side is, in its two subdivisions into, CH and HB.**

By length, d=1

$(\pi-3)d$	= (3.14159265358-3) × 1	0.14159265358
$(4-\pi)d$	= (4-3.14159265358) × 1	0.85840734642
		1.00000000000

By area, it will be also the same

The sub division of the side of the square gives, π as $\dfrac{14-\sqrt{2}}{4}$ only.

By length or by area, $\dfrac{14-\sqrt{2}}{4}$ comes out, as π value. So, $CH=(\pi-3)d$ is correct and is proved in both the ways (= length and area) of the ABCD square.

Further, the diagonal $\sqrt{2}d$ of the superscribed square of S.No. 19 and the circumference πd of its inscribed circle, are same; and may be the diagonal is a **straight line**, and the circle is a **curvature**.

SECOND PROOF BY AREA – BACKGROUND WORK

I thank you very much for your critical study of **August 3rd Method to derive Pi value.** One **Professor Johan Viaene** of Belgium has helped to understand the second proof much better with his formula. The second proof is based on the following diagram where a circle is inscribed in a square and the composite construction is divided into two different segments, called S_1 and S_2, and whose areas, can be derived, in terms of π constant, **spontaneously,** as the inscribed circle's area has to be calculated using $\frac{\pi d^2}{4}$.

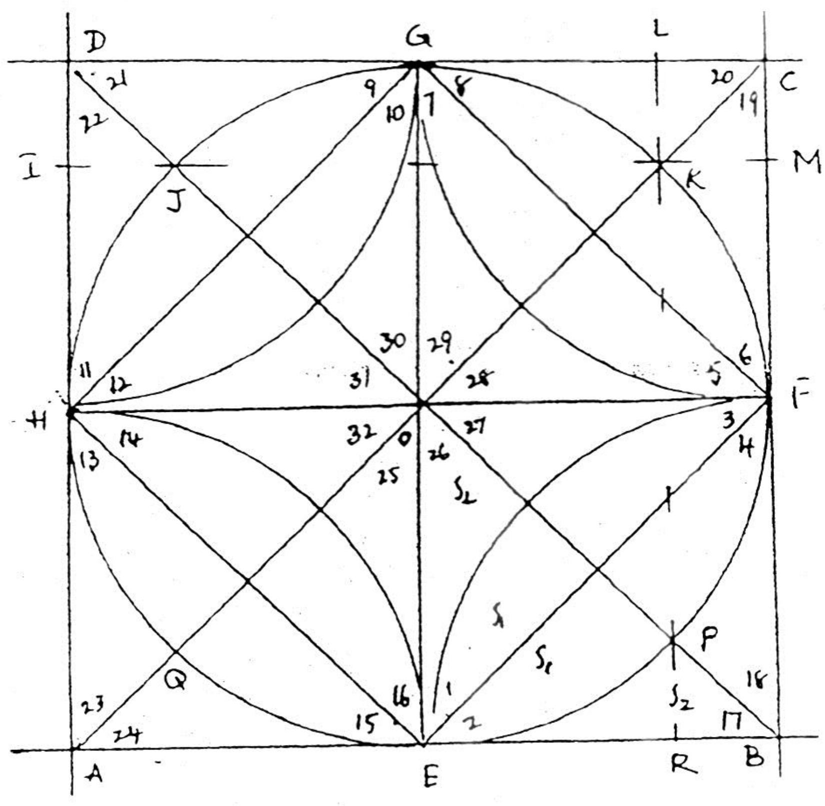
S_1 segment = $\frac{a^2}{32}(\pi - 2)$

and

S_2 segment = $\frac{a^2}{32}(4 - \pi)$

where, side = diameter = a = d

Some Professors have disagreed with this work, saying, the first proof, where line segments, such as side of the square and diagonal of the square, equating in terms of π constant, **is wrong**.



First diagram

Construction procedure

Draw a circle with center '0' and radius $a/2$. Diameter is 'a'. Draw 4 equidistant tangents on the circle. They intersect at A, B, C and D resulting in ABCD square. The side of the square is also equal to diameter 'a'. Draw two diagonals. E, F, G and H are the mid points of four sides. Join EG, FH, EF, FG, GH and HE. Draw four arcs with radius $a/2$ and with centres A, B, C and D. Now the circle square composite system is divided into 32 segments and numbered

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them 1 to 32. 1 to 16 are of one dimension called S_1 segments and 17 to 32 are of different dimension called S_2 segments. **Circle has 16S_1 and 8S_2 segments.**

Derivation of Formulae for the calculation of S_1 and S_2 segmental areas.

$16\,S_1 + 16\,S_2 = a^2$ = area of the Square … Eq. (1)

$16\,S_1 + 8\,S_2 = \frac{\pi a^2}{4}$ = area of the Circle … Eq. (2)

………………..…………………

(1) – (2) ⇒ $8S_2 = a^2 - \frac{\pi a^2}{4} = \frac{4a^2 - \pi a^2}{4} =$

$= \frac{(4-\pi)a^2}{32} = \frac{a^2}{32}(4-\pi)$

$S_2 = \frac{a^2}{32}(4-\pi)$

(2) x 2 ⇒ $32\,S_1 + 16\,S_2 = \frac{2\pi a^2}{4}$ … Eq. (3)

$16\,S_1 + 16\,S_2 = a^2$ … Eq. (1)

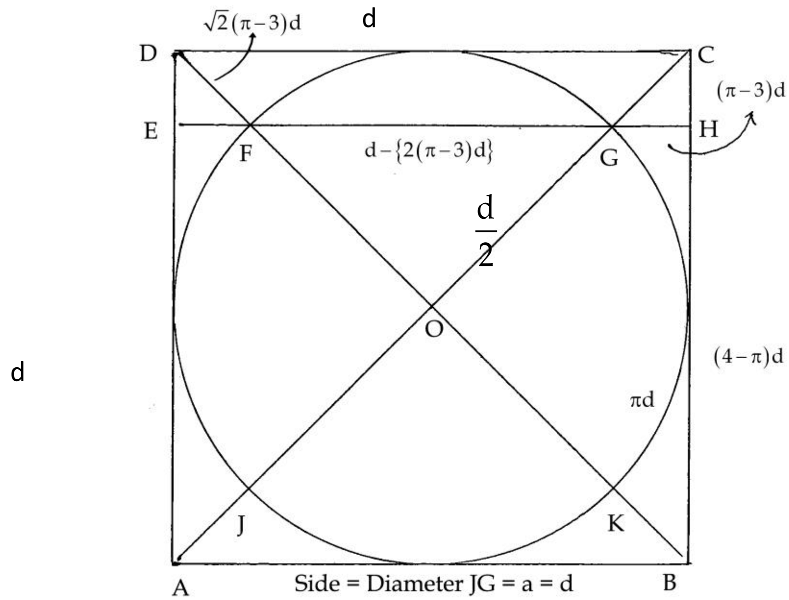
………………………………

(3) – (1) $16S_1 = \frac{\pi a^2}{2} - a^2$

$= \frac{a^2(\pi-2)}{32} = \frac{a^2}{32}(\pi-2)$

$S_1 = \frac{a^2}{32}(\pi-2)$

So, from the above diagram, it is clear, that the areas of square (i.e. square with its inscribed circle) can be calculated in terms of π constant also, and is **not un-mathematical** and it is a new approach in deriving the real Pi value of the inscribed circle, by **natural and spontaneous process** in seeing the unseen fundamental truth, which is evasive till now.



Second diagram

Prof. Johan, who is aware and deep studied this work, has equated the area of rectangle DEHC of the second diagram with his simple formula, which this author could do it only in eight pages and could not explain in mathematical terms, all the steps, as this author, is a non-mathematician. The idea of using S_1 and S_2 segmental formulas thus, has been made simple and clear by **Prof. Johan** for which this author is greatly indebted to him. His formula for DEHC rectangle in terms of S_1 and S_2 segmental formulas, is, as follows:

$$=\underbrace{2\left\{\frac{a^2}{32}(\pi-2)\right\}+2\left\{\frac{a^2}{32}(4-\pi)\right\}+\{(\pi-3)d\}^2}\quad=\left(\frac{32\pi-96}{32}\right)d^2$$

of this author of **Prof. Johan** Based on **Prof. Johan's** above formula, the second formula, on his line of approach – is as follows, for the area of second rectangle EABH of the second diagram.

$$=2\left\{\frac{a^2}{32}(\pi-2)\right\}+2\left\{\frac{a^2}{32}(4-\pi)\right\}+\{(4-\pi)d\}^2\quad=\left(\frac{128-32\pi}{32}\right)d^2$$

CONCLUSION

The real π value is $\dfrac{14-\sqrt{2}}{4}$ = 3.1464466… it is an algebraic number. Squaring a circle is no more an unsolved geometrical problem.

ACKNOWLEDGMENTS

This author has been on this Pi project from 1998 March onwards non-stop. More than one hundred different geometrical methods have been formulated to derive one π value and is $\dfrac{14-\sqrt{2}}{4}$=3.1464466… Nearly seven thousand Professors of the whole world have been informed by Post (Air mail). Four revised editions of books on Pi have been published and sent as complimentary copies to two thousand Professors all over the world by post (Air mail) spending Rupees One Million from his pocket. Prof. Constantine Karapapopulos of University of Patra, Greece,

Prof. Gernot Hoffmann of Emden, Germany, Prof. Johan Viaene of Belgium have contributed their works in support of this discovery. Prof. Gerry Leversha, Editor, The Mathematical Gazette, UK, Prof. Christopher J Sangwin of Birmingham University, UK, Dr. G.Narendran of Kerala, Prof. Puduru Arunachalam of Tirupati, India, have recognized this work by their deep study. Many more Professors have extended their help in the preparation of all the hundred articles. I am highly indebted to all these mathematicians. Miss Rama Mishra who was then a newly joined faculty member at IIT, Kharaghpur, India, Mathematics Department sent very encouraging comments on April 1998. This was author's first paper after a struggle of 26 years on-and-off search. I must personally express my gratefulness to her. Her encouraging comments led this work to travel to this paper next 17 years to this end.

REFERENCES

[1] **Lennart Berggren, Jonathan Borwein, Peter Borwein** (1997), Pi: A source Book, 2nd edition, Springer-Verlag Ney York Berlin Heidelberg SPIN 10746250.

[2] **Alfred S. Posamentier & Ingmar Lehmann** (2004), π, A Biography of the World's Most Mysterious Number, Prometheus Books, New York 14228-2197.

[3] **David Blatner,** *The Joy of Pi* (Walker/Bloomsbury, 1997).

[4] **RD Sarva Jagannada Reddy** (2014), New Method of Computing Pi value (Siva Method). IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 48-49.

[5] **RD Sarva Jagannada Reddy** (2014), Jesus Method to Compute the Circumference of A Circle and Exact Pi Value. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. I. (Jan. 2014), PP 58-59.

[6] **RD Sarva Jagannada Reddy** (2014), Supporting Evidences To the Exact Pi Value from the Works Of Hippocrates Of Chios, Alfred S. Posamentier And Ingmar Lehmann. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 2 Ver. II (Mar-Apr. 2014), PP 09-12

[7] **RD Sarva Jagannada Reddy** (2014), New Pi Value: Its Derivation and Demarcation of an Area of Circle Equal to Pi/4 in A Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 - 4759. Volume 2 Issue 5, May. 2014, PP-33-38.

[8] **RD Sarva Jagannada Reddy** (2014), Pythagorean way of Proof for the segmental areas of one square with that of rectangles of adjoining square. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. III (May-Jun. 2014), PP 17-20.

[9] **RD Sarva Jagannada Reddy** (2014), Hippocratean Squaring Of Lunes, Semicircle and Circle. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. II (May-Jun. 2014), PP 39-46

[10] **RD Sarva Jagannada Reddy** (2014), Durga Method of Squaring A Circle. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 14-15

[11] **RD Sarva Jagannada Reddy** (2014), The unsuitability of the application of Pythagorean Theorem of Exhaustion Method, in finding the actual length of the circumference of the circle and Pi. International Journal of Engineering Inventions. e-ISSN: 2278-7461, p-ISSN: 2319-6491, Volume 3, Issue 11 (June 2014) PP: 29-35.

[12] **R.D. Sarva Jagannadha Reddy (2014).** Pi treatment for the constituent rectangles of the superscribed square in the study of exact area of the inscribed circle and its value of Pi (SV University Method*). IOSR Journal of Mathematics (IOSR-JM), e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. I (Jul-Aug. 2014), PP 44-48.

[13] **RD Sarva Jagannada Reddy** (2014), To Judge the Correct-Ness of the New Pi Value of Circle By Deriving The Exact Diagonal Length Of The Inscribed Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 – 4759, Volume 2 Issue 7, July. 2014, PP-01-04.

[14] **RD Sarva Jagannadha Reddy (2014)** The Natural Selection Mode To Choose The Real Pi Value Based On The Resurrection Of The Decimal Part Over And Above 3 Of Pi (St. John's Medical College Method). International Journal of Engineering Inventions e-ISSN: 2278-7461, p-ISSN: 2319-6491 Volume 4, Issue 1 (July 2014) PP: 34-37

[15] **R.D. Sarva Jagannadha Reddy (2014).** An Alternate Formula in terms of Pi to find the Area of a Triangle and a Test to decide the True Pi value (Atomic Energy Commission Method) IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. III (Jul-Aug. 2014), PP 13-17

[16] **RD Sarva Jagannadha Reddy (2014)** Aberystwyth University Method for derivation of the exact π value. International Journal of Latest Trends in Engineering and Technology (IJLTET) Vol. 4 Issue 2 July 2014, ISSN: 2278-621X, PP: 133-136.
[17] **R.D. Sarva Jagannadha Reddy (2014).** A study that shows the existence of a simple relationship among square, circle, Golden Ratio and arbelos of Archimedes and from which to identify the real Pi value (Mother Goddess Kaali Maata Unified method). IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. III (Jul-Aug. 2014), PP 33-37
[18] **RD Sarva Jagannadha Reddy** (2014), Pi of the Circle (III Volumes), at www.rsjreddy.webnode.com.

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SYMMETRICAL DIVISION OF SQUARE AND CIRCLE (INTO 32) IS REFLECTED BY THE CORRECT DECIMAL PART OF THE CIRCUMFERENCE (0.14644660941…) OF CIRCLE HAVING UNIT DIAMETER

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ABSTRACT
Square and circle are different, in being, the former a straight line entity and the latter a curvilinear one. When a circle is inscribed in a square and the composite construction is divided symmetrically into 32 segments, it helps in finding the real Pi value.

KEYWORDS: Circle, diameter, diagonal, Pi, segment, side, square.

INTRODUCTION
Pi is a geometrical constant having its universal application from the celestial bodies such as stars, planets etc. in the infinite Space to a shining new coin in the hand. To know the length of the circumference, area of a circle and surface area, perimeter, and volume of the Earth (sphere) the value of π is a must. Unfortunately, π value has remained approximate till March 1998. From this day, even **without Pi,** the area and the circumference of circle can be calculated with the help of **radius alone,** just like, side in the square and altitude and base in the triangle.

$$\text{Area} = \pi r^2 \quad \text{or} \quad r\left(\frac{7r}{2} - \frac{\sqrt{2}r}{4}\right)$$

$$\text{Circumference} = 2\pi r \quad \text{or} \quad 6r + \frac{2r - \sqrt{2}r}{2}$$

Thank God, the real π value was revealed and is $\frac{14-\sqrt{2}}{4}$ = 3.14644660941…. Surprisingly, the mathematics community is not convinced of this discovery. Unmindful of this negligence by the mathematical world, the new value has been growing day by day and getting stronger with more evidences geometrically **challenging** of its reality. More than ten thousand Professors all over the world have been informed humbly and repeatedly of this discovery from March 1998 and continuing even today with every latest method that comes. Like that, nearly **more than hundred geometrical methods** have been submitted in the last 17 years. Not even one in thousand people, show interest in this *"extraordinary discovery*". There are a dozen Professors who wrote books on Pi value. They too, never responded. When papers were sent to the journals of Western countries for publication, the reply mostly has been, the new value is **revolutionary in its nature** and their journal would accept papers which support the **traditional π value** (i.e. 3.14159265358) **only**. This is the present situation prevailing in the Pi world. This author has been doing work on this new value single handedly without any research guide too, and with minimum knowledge in the basic geometry and now he is a retired Zoology Lecturer aged 70 years. Here is yet another attempt in support of the real π value. An interesting feature about the value of π is that everyone believes the concept of "limit" in arriving at the π value. Secondly, though 3.14159265358… actually represents polygon, it is argued strongly that there is no wrong in the limit concept, because, at infinity this lead to circle and polygon's value can be taken without any iota of doubt, as π of the circle. **Coming to the nature** of π value, **C.L.F. Lindemann's** proof of 1882 has been quoted universally as the correct one. According to Lindemann, π constant 3.14 is a transcendental number. He came to this conclusion based on the **Euler's equation** $e^{i\pi} + 1 = 0$. If we look at the Euler's equation, we find e, i, π, 1 and zero are the constituents. e is not an exact number, i means $\sqrt{-1}$, and π is 180^0. They are unrelated, and yet it is said, there lies

beauty of the equation. Coming to π, it is π radians 180^0. It is not π constant 3.14. If π constant 3.14 is involved, the Euler's equation looks like this

$$e^{i\times 180}+1=0$$

$$e^{i\times 3.14}+1=?$$

Are we to accept that

π radians 180^0 = π constant 3.14 ?

Then alone, π can be called a transcendental number and Linddemann's proof would be right. If π radians and π constant are **not** same or equal or identical, is it right to call π number as transcendental number, based on Euler's equation, where, this Euler's equation **rejects** outright the π constant in its fold ?

There is one more opinion prevailing in the mathematics world, and is, the **impossibility of "Squaring a circle".** This view has gained momentum from 1660 onwards and was expressed by **James Gregory** of Scotland first (perhaps). He is famous for his arc-tan infinite series in the computation of 3.14159265358… called as π value. Inspite of his opinion, mathematicians have been trying squaring a circle with the known π value as equal to 3.14159265358… **S. Ramanujan** has succeeded to a large extent. Lindemann's proof of 1882 calling 3.14159265358… as a transcendental number has **buried the idea of squaring a circle,** permanently. However, Ramanujan (1914) could do it.

Thus **to sum up**, we have, 3.14159265358… of polygon as π of the circle, 2. This number is a transcendental number and 3. Squaring a circle is an impossible concept.

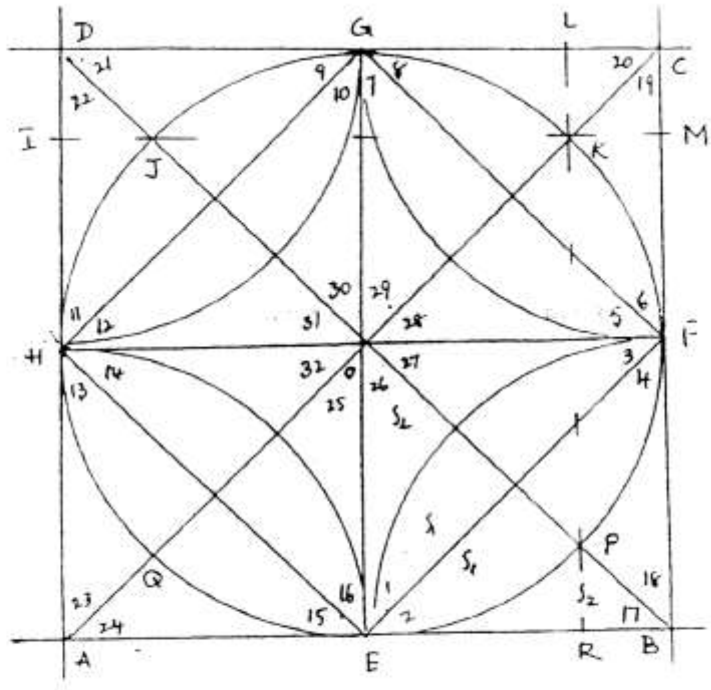
If one studies deeply, one point appears clear and that is, 3.14159265358… is not π of the circle, to be frank. Then, what is the number that can be called π of the circle ? **No answer**, then. From 1882 (of Lindemann) to March 1998 (discovery of true π value) the above views on π was **unchallengeable facts.**

The course of π has **changed** for the better **from March 1998** onwards. How ? the real π value became known to the world for the first time. This worker, because, of his luck and opportunity of seeing this real π value $\frac{14-\sqrt{2}}{4}$ could question the number 3.14159265358, calling as π of the circle, the transcendental nature of the π and the impossibility of squaring a circle, then on.

This author has been trying **to convince** the world of mathematics, that the real π value of circle, is, $3.14644660941...=\frac{14-\sqrt{2}}{4}$, π number is an **algebraic** number, and squaring a circle, circling a square and squaring an arbelos of Archimedes are **all very easy** geometrical processes.

METHOD

Construction procedure: Draw a circle with center '0' and radius *a*/2. Diameter is 'a'. Draw 4 equidistant tangents on the circle. They intersect at A, B, C and D resulting in ABCD square. The side of the square is also equal to diameter 'a'. Draw two diagonals. E, F, G and H are the mid points of four sides. Join EG, FH, EF, FG, GH and HE. Draw four arcs with radius *a*/2 and with centres A, B, C and D. Now the circle square composite system is divided into 32 segments and number them 1 to 32. 1 to 16 are of one dimension called S_1 segments and 17 to 32 are of different dimension called S_2 segments.



The number 32 is a significant number that divides square and circle symmetrically, without the loss of **identity or totality** of the both. When the side / diameter of square with its inscribed circle is one, the length of the circumference is equal to π.

Square: Side = a

Area = a^2, perimeter = 4a

Circle : Diameter = side = a = d

Area = $\frac{\pi d^2}{4} = \frac{\pi a^2}{4}$

Circumference = $\pi d = \pi a$

When the diameter is equal to one, the length of the circumference of circle is

$\pi d = \pi \times 1 = \pi$

There are many values to π. But two values are selected here. The official π value is 3.14159265358… The real π value was revealed by the Nature in March 1998, which is equal to $\frac{14-\sqrt{2}}{4}$ = 3.1464466… The new π value differs from the official π value from the **third** decimal. The official π value says third decimal is 1 and the new π value argues not 1 but 6. Secondly, the official π value remains always **approximate**, inspite of its astronomical dimension by its trillions of decimals. Whereas, the new π value is **exact,** being $\frac{14-\sqrt{2}}{4}$. Thirdly, the official π value is **transcendental** in nature and very very strongly argues that squaring of circle is **impossible**. Whereas, the new π value coolly says π is an **algebraic** number and happily announces that squaring of circle is, **as easy as, 2 x 2 = 4** .

In the official π value 3.14159265358… or in the new π value 3.14644660941… the **dispute** pertains to, in the **decimal part** i.e. 0.14159265358… of official π or 0.14644660941… of the new π. **Which is correct ? Archimedes** (240 BC) of Syracuse has said, instead of, in the decimal system (then it was not in vogue due to unknowing of zero in the number system in the western countries of the world) he has said in fraction *'less than 1/7'*. So,

$$\pi = 3 + \frac{1}{7} = \frac{22}{7}$$

Arithmetical process to choose the real π value

1. Area of the inscribed circle = $\frac{\pi d^2}{4}$
2. Area of the circumscribed square = d^2 = ($=a^2$)
   where, side = diameter = a = d
3. Square area – circle area = Area in between the square and circle or difference
   = $d^2 - \frac{\pi d^2}{4} = \frac{4d^2 - \pi d^2}{4}$
4. When the side of the square = 1
   Perimeter of the square = 4
   Diameter of the circle = d = 1
   Circumference of the circle = πd = π x 1 = π
5. $\frac{4d^2 - \pi d^2}{4}$ becomes $\frac{4-\pi}{4}$ when d = 1
6. We know, when the difference between the square and circle is equal to $\frac{4-\pi}{4}$, the side of the square is equal to 1.
7. **Let us find out** what would be the side of the square (and diameter of its inscribed circle) if the difference is 1 instead of $\frac{4-\pi}{4}$.
   $\frac{4-\pi}{4}$ when side is 1
   Suppose, when the difference is 1 what would be the side ?
   $\frac{1}{\frac{4-\pi}{4}} \times 1$ = $\frac{4}{4-\pi}$
   So, when the difference between the square and circle is 1, the side of the square would be $\frac{4}{4-\pi}$ = say x
8. The decimal part of the π value is represented as 0.14159265358… for the official π value, and 0.14644660941… is represented for the new value, and for both it can be written as
   π – 3 = y
   So, π – 3 = 3.14159265358 – 3 = 0.14159265358 (official)
   = 3.14644660941 – 3 = 0.14644660941 (new)
9. Divide x with y, which **reflects** the number 32 by which the square and its inscribed circle exist symmetrically (Figure)
   $= \frac{x}{y} = 32 \quad = \frac{\frac{4}{4-\pi}}{\pi - 3} \quad = \frac{4}{(4-\pi)(\pi-3)}$
10. **<u>Identification of the correct π value</u>**
   Using the above formula, which is in terms of π, one can choose the real π value out of a few numbers in the literature, because **every worker claims including the mathematical establishment** his/ its value is right.
   So, the formula is = $\frac{4}{(4-\pi)(\pi-3)}$ = 32

S. No.	π value	Formula	Square – circle division number = 32
1.	Official value 3.14159265358	$\frac{4}{(4-3.14159265358)(3.14159265358-3)}$ $= \frac{4}{0.85840734642 \times 0.14159265358}$	$= \frac{4}{0.12154417403} = 32.9$
2.	Gogawale Lakshman's Value $17-8\sqrt{3} =$ 3.1435935396	$= \frac{4}{0.8564064604 \times 0.1435935396}$	$= \frac{4}{0.12297443498} = 32.5$
3.	Pi value from the Golden ratio of Jain of Australia and Mark Wollum 3.144605511	$= \frac{4}{0.855394489 \times 0.144605511}$	$= \frac{4}{0.12369475718} = 32.3$
4.	1998 Pi value $\frac{14-\sqrt{2}}{4} =$ 3.14644660941	$= \frac{4}{0.85355339059 \times 0.14644660941}$	$= \frac{4}{0.125} = 32$

From the above calculations, $\frac{14-\sqrt{2}}{4} = 3.14644660941\ldots$ is proved the real π value by this arithmetic process.

CONCLUSION

The official π value 3.14159265358… is not the real π value. The true π value is $\frac{14-\sqrt{2}}{4} = 3.14644660941\ldots$ though the official π value 3.14159265358… is also obtained with the help of many polygons inscribed, doubling at every step; but the value of the inscribed polygon is **attributed** to the circle. **It is a mistake,** to be frank. Whereas, the 1998 π value, too takes the help of 4-gon polygon called square, but a **different approach** is adopted which no body adopted in the last 2400 years. **Eudoxus's of Cnidus** (408 BC – 355 BC), Greece, method is still the method we are believing in the name of "limit" and forgot to think of a better method, than this.

REFERENCES

[1] **Lennart Berggren, Jonathan Borwein, Peter Borwein** (1997), Pi: A source Book, 2nd edition, Springer-Verlag Ney York Berlin Heidelberg SPIN 10746250.
[2] **Alfred S. Posamentier & Ingmar Lehmann** (2004), π, A Biography of the World's Most Mysterious Number, Prometheus Books, New York 14228-2197.
[3] **David Blatner,** *The Joy of Pi* (Walker/Bloomsbury, 1997).
[4] **William Dunham** (1990), Journey through Genius, Penguin Books USA.
[5] **Richard Courant et al** (1996) What is Mathematics, Oxford University Press.
[6] **RD Sarva Jagannada Reddy** (2014), New Method of Computing Pi value (Siva Method). IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 48-49.
[7] **RD Sarva Jagannada Reddy** (2014), Jesus Method to Compute the Circumference of A Circle and Exact Pi Value. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. I. (Jan. 2014), PP 58-59.
[8] **RD Sarva Jagannada Reddy** (2014), Supporting Evidences To the Exact Pi Value from the Works Of Hippocrates Of Chios, Alfred S. Posamentier And Ingmar Lehmann. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 2 Ver. II (Mar-Apr. 2014), PP 09-12
[9] **RD Sarva Jagannada Reddy** (2014), New Pi Value: Its Derivation and Demarcation of an Area of Circle Equal to Pi/4 in A Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 - 4759. Volume 2 Issue 5, May. 2014, PP-33-38.

[10] **RD Sarva Jagannada Reddy** (2014), Pythagorean way of Proof for the segmental areas of one square with that of rectangles of adjoining square. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. III (May-Jun. 2014), PP 17-20.
[11] **RD Sarva Jagannada Reddy** (2014), Hippocratean Squaring Of Lunes, Semicircle and Circle. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. II (May-Jun. 2014), PP 39-46
[12] **RD Sarva Jagannada Reddy** (2014), Durga Method of Squaring A Circle. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 14-15
[13] **RD Sarva Jagannada Reddy** (2014), The unsuitability of the application of Pythagorean Theorem of Exhaustion Method, in finding the actual length of the circumference of the circle and Pi. International Journal of Engineering Inventions. e-ISSN: 2278-7461, p-ISSN: 2319-6491, Volume 3, Issue 11 (June 2014) PP: 29-35.
[14] **R.D. Sarva Jagannadha Reddy (2014).** Pi treatment for the constituent rectangles of the superscribed square in the study of exact area of the inscribed circle and its value of Pi (SV University Method*). IOSR Journal of Mathematics (IOSR-JM), e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. I (Jul-Aug. 2014), PP 44-48.
[15] **RD Sarva Jagannada Reddy** (2014), To Judge the Correct-Ness of the New Pi Value of Circle By Deriving The Exact Diagonal Length Of The Inscribed Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 – 4759, Volume 2 Issue 7, July. 2014, PP-01-04.
[16] **RD Sarva Jagannadha Reddy (2014)** The Natural Selection Mode To Choose The Real Pi Value Based On The Resurrection Of The Decimal Part Over And Above 3 Of Pi (St. John's Medical College Method). International Journal of Engineering Inventions e-ISSN: 2278-7461, p-ISSN: 2319-6491 Volume 4, Issue 1 (July 2014) PP: 34-37
[17] **R.D. Sarva Jagannadha Reddy (2014).** An Alternate Formula in terms of Pi to find the Area of a Triangle and a Test to decide the True Pi value (Atomic Energy Commission Method) IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. III (Jul-Aug. 2014), PP 13-17
[18] **RD Sarva Jagannadha Reddy (2014)** Aberystwyth University Method for derivation of the exact π value. International Journal of Latest Trends in Engineering and Technology (IJLTET) Vol. 4 Issue 2 July 2014, ISSN: 2278-621X, PP: 133-136.
[19] **R.D. Sarva Jagannadha Reddy (2014).** A study that shows the existence of a simple relationship among square, circle, Golden Ratio and arbelos of Archimedes and from which to identify the real Pi value (Mother Goddess Kaali Maata Unified method). IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. III (Jul-Aug. 2014), PP 33-37
[20] **RD Sarva Jagannadha Reddy** (2015). The New Theory of the Oneness of Square and Circle. International Journal of Engineering Sciences & Research Technology, 4.(8): August, 2015, ISSN: 2277-9655, PP: 901-909.
[21] **RD Sarva Jagannadha Reddy** (2015). Leonardo Da Vinci's Ingenious Way of Carving One-Fourth Area of A Segment in A Circle. International Journal of Engineering Sciences & Research Technology, 4.(10): October, 2015, ISSN: 2277-9655, PP: 39-47.
[22] **RD Sarva Jagannadha Reddy** (2015), Pi of the Circle (III Volumes), at www.rsjreddy.webnode.com.

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DOUBLING THE CUBE IN TERMS OF THE NEW Pi VALUE (A GEOMETRIC CONSTRUCTION OF CUBE EQUAL TO 2.0001273445)

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ABSTRACT
The three unsolved geometrical problems are trisection of an arbitrary angle, duplication of the cube and squaring of circle. Here is one attempt to get the side of the cube equal to its doubled volume 2.0001… by the help of straight edge and compass only and in terms of the new Pi value (14 – root2)/4. The official Pi value 3.1415926… gives 2.02

KEYWORDS: Circle, cube, diameter, duplication, diagonal, side, square.

INTRODUCTION
The unsolvable nature of three geometrical problems are trisection of an arbitrary angle, duplication of the cube and squaring a circle. However, trisection of 90^0 angle is possible. Squaring of circle is also possible. And we may ask why, squaring of circle was an unsolved problem till now ? The reason is that 3.1415926… has been taken as the value of π constant. **In fact it is not the real π value.** In March 1998, the true π value $\frac{\left(14-\sqrt{2}\right)}{4} = 3.14644466\ldots$ was revealed by the Nature. It has helped to square a circle exactly with the newly discovered value. Unfortunately, we have been adopting only one geometrical method called Exhaustion method of **Eudoxus of Cnidus** (408 BC – 355 BC), Greece. **Sir Thomas Heath** has said of Eudoxus "*He was a man of Science if ever there was one*". In mathematics, Eudoxus is remembered, for two major contributions. One was his theory of proportion, and the other his method of exhaustion. A circle is a totally curvilinear, and thus quite intractable, plane figure. But if we inscribe within it a square, and then double the number of sides of the square to get an octagon, and then again double the number of sides to get a 16-gon, and so on, we will find these relatively simple polygons even more closely approximately the circle itself. In Eudoxean terms, the polygons are "exhausting" the circle from within.

Unfortunately, this method still is the sole method to compute the length of the circle. This inscribed polygon **never** merges with the circumference of the circle, and it **remains inside** the circle. This is the reason why the present official Pi value 3.1415926… is **lesser than** the predicted / unknown actual value which is 3.1464466… discovered in March 1998. So, it is very clear that our assumption is wrong in saying that 3.1415926… is approximate **always** of its **last decimal** onwards, but it is proved now that it is approximate at its **third** decimal, which we never dreamt of it till now.

$$\pi = \frac{\text{Circumference of circle}}{\text{Diameter of circle}} > \frac{\text{Perimeter of inscribed polygon}}{\text{Diameter of circle}}$$

This new Pi value has squared a circle exactly. **Thank God,** no more squaring of circle is an unsolved geometrical problem now.

Another problem is doubling the cube. It means, if the given cube has an edge of unit length, its volume will be the cubic unit, it is required that we find the edge x of a cube with twice this volume. The required edge x will therefore satisfy the simple cubic equation.

$$x^3 - 2 = 0$$

It has been called an impossible problem for many centuries with a straight edge and a compass, only.

The new π value $\frac{14-\sqrt{2}}{4}$ has made this doubling of the cube **almost** possible. The new theory of **oneness** of square and circle has not only revealed the real π value $\frac{14-\sqrt{2}}{4}$ and also revealed doubling of the cube is not impossible. The volume of the doubled cube is equal to 2.00012… is obtained now in the following geometrical construction. The role of π constant, surprisingly is involved in understanding the concept of doubling the cube also. The new formula is

$$\frac{d}{2}\sqrt{89+5\pi^2-42\pi} \quad \approx \quad \sqrt[3]{2}$$

where d = a = side = diameter and $\sqrt[3]{2}$ **= 1.25992104989**

When new π value $\frac{14-\sqrt{2}}{4}$ is involved in the above formula we get the value equal to 1.25994778998 and

$(1.25992104989)^3$ = 1.99999999998 (expected volume of doubled cube)
$(1.25994778998)^3$ = 2.0001273441 (from present construction)

It is clear, therefore, we get less approximation in doubling the cube with the official π value with 2.02 and with the almost accurate value with the new π value and the value for the doubled cube is 2.0001. Let us not forget that square is two dimensional and the cube is three dimensional. **This basic difference may be the reason in not getting the exact value i.e., 2.0 of doubled cube from the two-dimensional square, drawn on a paper.**

This method also tells us that $\frac{14-\sqrt{2}}{4}$ is the real π value. Let us see how ?

PROCEDURE

A square ABCD of a given side is drawn. A circle is inscribed in it. Two diagonals AC and BD are drawn. The diagonals intersect the circle at E, F, G and H. When four parallel lines through the points E, F, G, H to the four sides are drawn, we get four smaller squares for example, one square is KHJD. One parallel line is drawn through EH which is equal to AD. The sum of the lengths of IE, EH and HJ is equal to the side AD. HM is half the length of HJ.

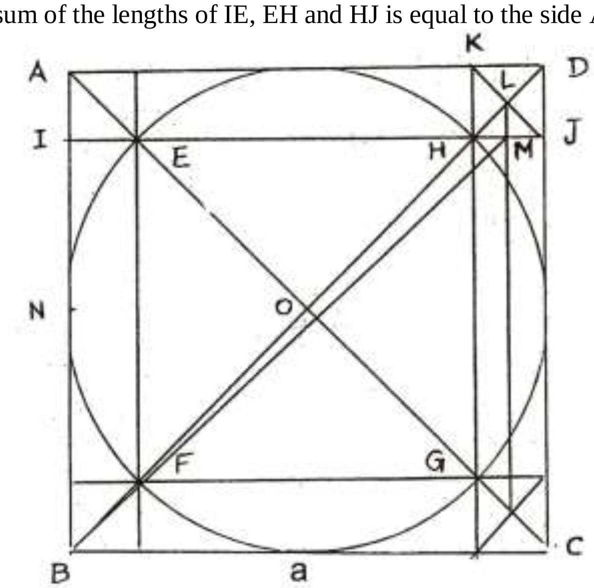


Fig.1

1. IE = IA = HJ = $\frac{\sqrt{2}a-1a}{2\sqrt{2}}$
2. EH = $\frac{\sqrt{2}a}{2}$

3. IE + EH+ HJ = a (side of the square)
4. HM = $\frac{HJ}{2} = \frac{\sqrt{2}a - 1a}{4\sqrt{2}}$
5. IA + IN + NB = a (side of the square)
6. IN = $\frac{\sqrt{2}a}{4}$
7. NB = $\frac{a}{2}$

When we join BM we get a right angled triangle IBM. IB and IM are the two sides and BM is the hypotenuse.

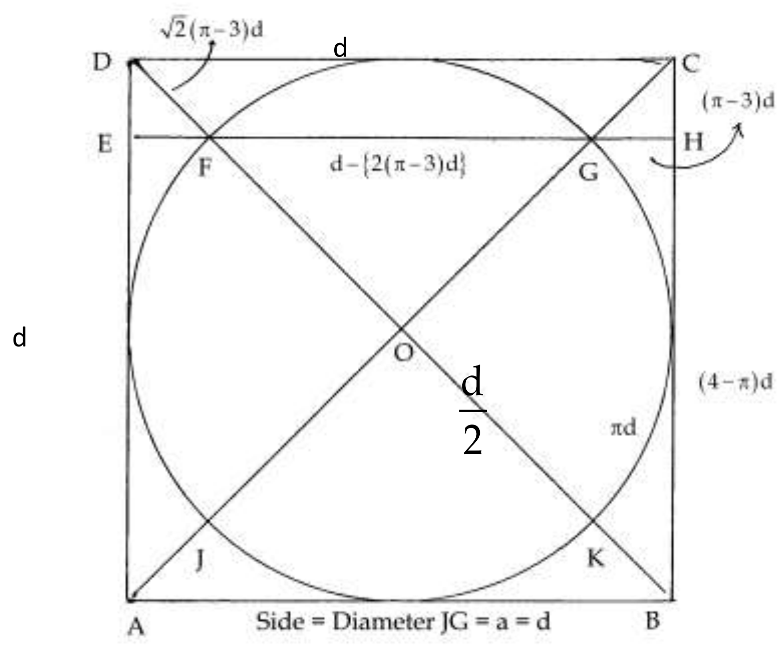
8. IM = IE + EH + HM
9. IB = IN + NB
10. MB $= \sqrt{(IE + EH + HM)^2 + (IN + NB)^2}$

$$= \sqrt{\left(\frac{\sqrt{2}a - 1a}{2\sqrt{2}} + \frac{\sqrt{2}a}{2} + \frac{\sqrt{2}a - 1a}{4\sqrt{2}}\right)^2 + \left(\frac{\sqrt{2}a}{4} + \frac{a}{2}\right)^2}$$

$$= \sqrt{\left(\frac{31 + 14\sqrt{2}}{32}\right)a^2}$$

MB is the hypotenuse which is also the required side of the cube double that with the side BC.

Part-II
DOUBLING THE CUBE IN TERMS OF π CONSTANT



Lens of Fig.1 are equated to Pi here
Fig-2

11. HJ of Fig.1 = GH of Fig. 2 = $(\pi - 3)d$

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12. HM = MJ (Fig.1) = $\frac{(\pi-3)d}{2}$
13. IJ = d
14. MJ = $\frac{(\pi-3)d}{2}$
15. IM = IJ – MJ = d – $\frac{(\pi-3)d}{2} = \frac{2d-(\pi-3)d}{2}$
16. IB of Fig.1 = EA of Fig.2 = $(4-\pi)d$
17. MB = Hypotenuse = $\sqrt{(IM)^2+(IB)^2}$

$$= \sqrt{\left(\frac{2d-(\pi-3)d}{2}\right)^2+\{(4-\pi)d\}^2}$$

$$= \frac{d}{2}\sqrt{89+5\pi^2-42\pi} \approx \sqrt[3]{2}$$

where d = a = diameter = side

In the literature, on survey, we find many values to π. And they are 3.14, 3.141, 3.142 $\left(=\frac{22}{7}\right)$, 3.1416, 3.143 $\left(=17-8\sqrt{3}\right)$, 3.144 …. from Golden ratio etc.

The new π value $\frac{14-\sqrt{2}}{4}$ = 3.1464466… gives the volume of doubled cube equal to as 2.0001… and hence this construction **decides** $\frac{14-\sqrt{2}}{4}$ is the **true** π value.

CONCLUSION

Squaring a circle and doubling a cube are solvable geometrical constructions with straight a edge and compass only. This concept of doubling the cube has helped in this paper in choosing the real π value also.

REFERENCES

[1] **Lennart Berggren, Jonathan Borwein, Peter Borwein** (1997), Pi: A source Book, 2nd edition, Springer-Verlag Ney York Berlin Heidelberg SPIN 10746250.
[2] **Alfred S. Posamentier & Ingmar Lehmann** (2004), π, A Biography of the World's Most Mysterious Number, Prometheus Books, New York 14228-2197.
[3] **David Blatner,** *The Joy of Pi* (Walker/Bloomsbury, 1997).
[4] **William Dunham** (1990), Journey through Genius, Penguin Books USA.
[5] **Richard Courant et al** (1996) What is Mathematics, Oxford University Press.
[6] **RD Sarva Jagannada Reddy** (2014), New Method of Computing Pi value (Siva Method). IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 48-49.
[7] **RD Sarva Jagannada Reddy** (2014), Jesus Method to Compute the Circumference of A Circle and Exact Pi Value. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. I. (Jan. 2014), PP 58-59.
[8] **RD Sarva Jagannada Reddy** (2014), Supporting Evidences To the Exact Pi Value from the Works Of Hippocrates Of Chios, Alfred S. Posamentier And Ingmar Lehmann. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 2 Ver. II (Mar-Apr. 2014), PP 09-12
[9] **RD Sarva Jagannada Reddy** (2014), New Pi Value: Its Derivation and Demarcation of an Area of Circle Equal to Pi/4 in A Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 - 4759. Volume 2 Issue 5, May. 2014, PP-33-38.

[10] **RD Sarva Jagannada Reddy** (2014), Pythagorean way of Proof for the segmental areas of one square with that of rectangles of adjoining square. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. III (May-Jun. 2014), PP 17-20.

[11] **RD Sarva Jagannada Reddy** (2014), Hippocratean Squaring Of Lunes, Semicircle and Circle. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. II (May-Jun. 2014), PP 39-46

[12] **RD Sarva Jagannada Reddy** (2014), Durga Method of Squaring A Circle. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 14-15

[13] **RD Sarva Jagannada Reddy** (2014), The unsuitability of the application of Pythagorean Theorem of Exhaustion Method, in finding the actual length of the circumference of the circle and Pi. International Journal of Engineering Inventions. e-ISSN: 2278-7461, p-ISSN: 2319-6491, Volume 3, Issue 11 (June 2014) PP: 29-35.

[14] **R.D. Sarva Jagannadha Reddy (2014).** Pi treatment for the constituent rectangles of the superscribed square in the study of exact area of the inscribed circle and its value of Pi (SV University Method*). IOSR Journal of Mathematics (IOSR-JM), e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. I (Jul-Aug. 2014), PP 44-48.

[15] **RD Sarva Jagannada Reddy** (2014), To Judge the Correct-Ness of the New Pi Value of Circle By Deriving The Exact Diagonal Length Of The Inscribed Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 – 4759, Volume 2 Issue 7, July. 2014, PP-01-04.

[16] **RD Sarva Jagannadha Reddy (2014)** The Natural Selection Mode To Choose The Real Pi Value Based On The Resurrection Of The Decimal Part Over And Above 3 Of Pi (St. John's Medical College Method). International Journal of Engineering Inventions e-ISSN: 2278-7461, p-ISSN: 2319-6491 Volume 4, Issue 1 (July 2014) PP: 34-37

[17] **R.D. Sarva Jagannadha Reddy (2014).** An Alternate Formula in terms of Pi to find the Area of a Triangle and a Test to decide the True Pi value (Atomic Energy Commission Method) IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. III (Jul-Aug. 2014), PP 13-17

[18] **RD Sarva Jagannadha Reddy (2014)** Aberystwyth University Method for derivation of the exact π value. International Journal of Latest Trends in Engineering and Technology (IJLTET) Vol. 4 Issue 2 July 2014, ISSN: 2278-621X, PP: 133-136.

[19] **R.D. Sarva Jagannadha Reddy (2014).** A study that shows the existence of a simple relationship among square, circle, Golden Ratio and arbelos of Archimedes and from which to identify the real Pi value (Mother Goddess Kaali Maata Unified method). IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. III (Jul-Aug. 2014), PP 33-37

[20] **RD Sarva Jagannadha Reddy** (2015). The New Theory of the Oneness of Square and Circle. International Journal of Engineering Sciences & Research Technology, 4.(8): August, 2015, ISSN: 2277-9655, PP: 901-909.

[21] **RD Sarva Jagannadha Reddy** (2015). Leonardo Da Vinci's Ingenious Way of Carving One-Fourth Area of A Segment in A Circle. International Journal of Engineering Sciences & Research Technology, 4.(10): October, 2015, ISSN: 2277-9655, PP: 39-47.

[22] **RD Sarva Jagannadha Reddy** (2015), Pi of the Circle (III Volumes), at www.rsjreddy.webnode.com.

A BREAK – THROUGH, NO MORE Pi FOR CIRCLE

Tirupati, India
Dt: 17-11-2015

Dear Professor,

Namasthe !

1. The area of the square can be calculated with the help of side (a) of it. The formula is a^2.
2. Similarly, the area of the triangle can be calculated with the help of altitude (a) and base (b) of the triangle. The formula is ½ ab.
3. The area and the length of the circumference of the circle can be calculated with the following formulae:

$$\text{Area} = r\left(\frac{7r}{2} - \frac{\sqrt{2}r}{4}\right)$$

$$\text{Circumference} = 6r + \frac{2r - \sqrt{2}r}{2}$$

where r = radius

The official π value 3.14159265358… though has been in vogue for the last 2000 years, nobody could succeed to devise a formula with radius alone. The main reason is that 3.14159265358… is **not** π value. Radius, invariably gives the true π value in the simplest formula.

Further, in the above formulae the involvement of $\sqrt{2}$ is **questioned by almost all** who are carried away by the CLF Lindemann's proof of 1882 saying that 3.14159265358… is a transcendental number. He is right if he says 3.14159265358… is a transcendental number. Unfortunately, it is **not** the π of the circle.

Secondly, if anybody asks, is square or circle is first on the lines of "egg and chick" which is first ? This author believes that circle is first. How ? One can draw circle easily with fingers only and **without** the help of the instrument compass. But, drawing a square is not difficult but impossible. 2. All the celestial bodies: stars, planets etc. are spherical in shape. Eyeball is spherical and iris and pupil in the eyeball are circular in shape.

Though the irrational number $\sqrt{2}$ was discovered first in the square by **Hippasus** (5th Century BC) **of Metapontum** (and for his great discovery he was drowned by the fellow Pythagoreans), square root two's ($\sqrt{2}$) existence was **not** noticed in the circle, then. $\sqrt{2}$ **is a hidden truth in the circle.** A square can be created with circle as its four equidistant chords. And also, a square can be created as a circumscribed one about a circle, as its four equidistant tangents. Similarly, $\sqrt{3}, \sqrt{5}$ can be obtained with just circles arranged in different patterns. Thus, $\sqrt{2}$ **is originally a part of the circle** although it was discovered from the square first. The above formulae are thus the proof to associate that $\sqrt{2}$ with circle is a **natural phenomenon of Geometry** and not, $\sqrt{2}$ and circle, are the two **incompatible entities, definitely.**

It is sad to hear about Hippasus, that *"If true, the story indicates the dangers inherent in free thinking, even in the relatively austere discipline of mathematics"* (**William Dunham, Journey through Genius,** Page 10).

Truth cannot be suppressed **permanently**. It is proved now that π is an **algebraic number** with the March 1998 discovery of $\frac{14-\sqrt{2}}{4}$ = 3.14644660941… Mathematicians have been trying squaring a circle. **Prof. Petr Beckmann** (1971) in his book, **The History of Pi** (Page 173) says *"But undaunted by either the Academy's resolution or Lindemann's proof, the circle squares marched on; and they are still marching, spiteful of the cruel world that will not recognize their grand intellectual achievements"*.

The search for truth thus puts the scholar sometimes in a helpless situation. This happened to Hippasus and Bruno, killing them both, the former for introducing $\sqrt{2}$ and the latter in supporting the Heliocentric theory. It appears that, the "*intolerance*" still persists now in the academic world. This author is being laughed at, at his very face by some local Professors and some became very furious too. Some outside Professors have gone to the extent of abusing this author personally through their emails using filthy words. Is it not much more grievous than killing, Sir ? I request every mathematician to spend a few minutes and decide **for or against** the algebraic nature of π, which is a fundamental concept in Mathematics.

Best regards,

Sincerely,

RSJ Reddy
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TIRUPATI.
India

(Hundred different geometrical methods are available in support of the above formulae. Log in www.rsjreddy.webnode.com or contact the author rsjreddy1341946@gmail.com, two simple methods will be sent by e-mail on request)

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THE DIAGONAL – CIRCUMFERENCE-Pi OF SIMPLEST RELATION

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ABSTRACT
A circle can be inscribed in a square. The diagonals are the part of the square. Circumference is part of the circle. The diagonal of the square helps in finding the length of the circle and its Pi value.

KEYWORDS: Circle, circumference, diagonal, diameter, side, square.

INTRODUCTION
The circle and its circumscribed square is a natural geometrical relation. Human mind could not understand the circle properly because of circle's curvature. The area and circumference of circle has been estimated till now approximately. Their exact values have become a challenge to the human intelligence. Millions of mathematicians all these years of human civilization have tried and failed. Interestingly, we have been told for 2000 years by the mathematicians that π value equal to 3.14159265358… is final and is **almost exact.** Till March 1998, every student, scientist, mathematician had believed that $\frac{22}{7}$ for school children and 3.14159265358… at the research level and used as the π values. However, some people did not believe this thinking because they asked themselves, why should there be two values for one constant called π.

When this was the thinking prevailing then, this author, in 1972, when he was 26 years old, asked himself a different question. The question was "Why should π occurs in πr^2 and $2\pi r$ as **constant** in finding the extent of area of circle. Why such constant was **not used** when area of square and perimeter of square were calculated ? This question made this author to think to **eliminate π constant** altogether from the circle and calculated area and circumference with radius alone, as is the practice in square, where side(a) is the sole line segment in a^2 and 4a of area and perimeter of the square respectively. God is kind and revealed two formulae in March 1998, with radius, for area and circumference of circle.

The two formulae are

$$\text{Area of circle} = r\left(\frac{7r}{2} - \frac{\sqrt{2}r}{4}\right)$$

$$\text{Circumference of circle} = 6r + \frac{2r - \sqrt{2}r}{2}$$

The above two formulae when **equated** to πr^2 and $2\pi r$, the value of π is $\frac{14-\sqrt{2}}{4}$ =3.14644660941… Thus, to conclude, the area and circumference of circle can be calculated

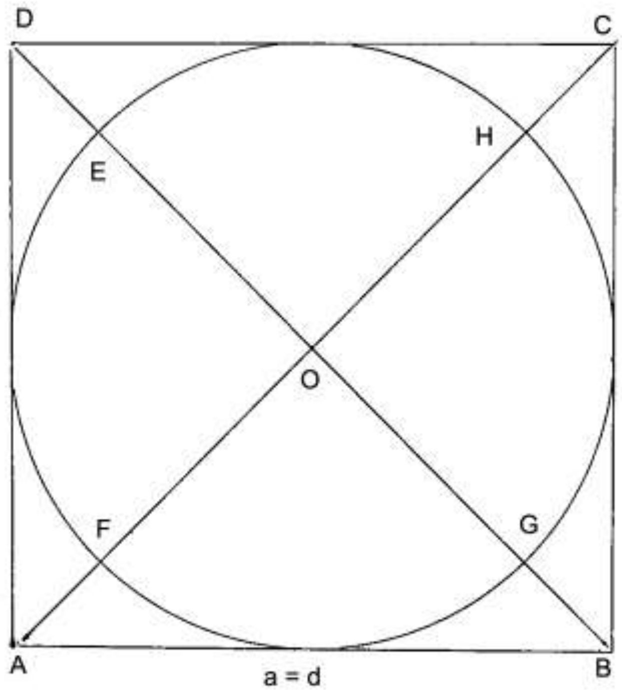
1. Without π constant and
2. With π constant, but value found to be, not $\frac{22}{7}$ or 3.14159265358.. but $\frac{14-\sqrt{2}}{4}$ = 3.14644660941….

So, for the first time in the history of mathematics, one value to π which is exact and kindly is revealed by God for the benefit of humanity. Thank God if you concur with this author, Sir.

Procedure:
Square: ABCD, side = AB = a = d
Circle: Centre = O, Diameter = FH = d = a
Diagonal = AC = BD = $\sqrt{2}$ a

Corner length = AF = HC = $\frac{\text{Diagonal} - \text{diameter}}{2} = \frac{AC - FH}{2} = \frac{\sqrt{2}a - a}{2}$

Circumference = $\pi d = \pi a$



There is **no difference** between the diagonal of the square $\sqrt{2}a$, and the circumference $\pi d = \pi a$ of the inscribed circle.

There exists very clear and exact relation which is the simplest among 1.**Side**, 2. **Diameter**, 3. **Diagonal**, 4. **Circumference** and 5. **Corner length** as shown below:

$$16 = \frac{\text{Diagonal}}{\text{Diagonal} - \text{Diameter}} + 4\pi$$

$$= 16 = \frac{\sqrt{2}a}{\sqrt{2}a - a} + 4\pi$$

Where a = d = side = diameter

From the above natural formula, it is humbly submitted now that π is an **algebraic number** equal to $\frac{14 - \sqrt{2}}{4}$ and not a transcendental number. May be the so called official π number 3.14159265358… a transcendental number but definitely not the real π of the circle, derived from the concerned **line-segments** of the square-circle nexus which is very natural.

This author may kindly be permitted to share his views with you, Sirs. If you are one among the supporters of the present 2000-year old official number 3.14159265358… which has been believed, derived and **established as final**, by very great mathematicians cum Scientists especially Sir Issac Newton, across the world, still, can you Sir, derive, similarly, this 3.14159265358… using the square – circle or polygon – circle construction involving concerned **line-segments,** like the one above ?

If you can do it, it is quite welcome and this author would say "Sorry" to you Sir, and stop his labour of search.

If you can not do it, and if you can not disprove the above formula, this author humbly requests you Sir, in the interest of enrichment of **real** mathematics, may stop believing that 3.14159265358… as π of the circle and further requests you Sir, to announce it, to the world from the portal of your esteemed and great university what is the real π value ?

In the name of so called a **Proof of rigour**, kindly do not deny this divine value $\frac{14-\sqrt{2}}{4}$ of the **intelligence of the Cosmic Mind.**

"Ramanujan had no formal education in Mathematics. He left his proofs lacking rigour. But pioneers and path-finders, exploring boldly new terrains of mathematical thought, permit themselves a freedom in their attack on a mathematical problem. Their intuition often provides them with an innate feeling for what is correct and what is not" (Page No-192).

- T.S. Bhanu Murthy, A Modern Introduction to Ancient Indian Mathematics, 2nd Edn. New Age International Publishers, 2009, New Delhi.

Baudhayana theorem (Pythagorean theorem) has about 370 proofs. Nobody questions it because it is true. Whereas 3.14159265358… is not the **single value for π.** There are many numbers, **mathematicians** across the world have been proposing still, unbelieving 3.14159265358… as π of the circle. This is a clear proof that this number has **no single proof of its existence in circle,** either geometrically or arithmetically based on the concerned line segments. When this is the reality for 2000 years and the failure of millions of mathematicians of the past is very clear, **the new number needs a serious study** because it is backed by more than hundred different geometrical constructions as proofs. For more details www.rsjreddy.webnode.com A final request to you, Sir, kindly **avoid using harsh words if you differ,** such as addressing this author very recently, as "Dear Idiot Crank" by one honourable Professor (and this Honourable Professor has also said his colleagues too feel the same for sharing this work). Is it for this laurel, a Zoology teacher cum student labored 43 years since 1972 and spent rupees one million from his poor pocket in the last 17 years, after the discovery of March 1998 Pi number $\frac{14-\sqrt{2}}{4}$?

CONCLUSION

The π value is an **algebraic number** and that value is $\frac{14-\sqrt{2}}{4} = 3.14644660941\ldots$

REFERENCES

[1] **Lennart Berggren, Jonathan Borwein, Peter Borwein** (1997), Pi: A source Book, 2nd edition, Springer-Verlag Ney York Berlin Heidelberg SPIN 10746250.
[2] **Alfred S. Posamentier & Ingmar Lehmann** (2004), π, A Biography of the World's Most Mysterious Number, Prometheus Books, New York 14228-2197.
[3] **David Blatner,** *The Joy of Pi* (Walker/Bloomsbury, 1997).
[4] **William Dunham** (1990), Journey through Genius, Penguin Books USA.
[5] **Richard Courant et al** (1996) What is Mathematics, Oxford University Press.
[6] **RD Sarva Jagannada Reddy** (2014), New Method of Computing Pi value (Siva Method). IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 48-49.
[7] **RD Sarva Jagannada Reddy** (2014), Jesus Method to Compute the Circumference of A Circle and Exact Pi Value. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. I. (Jan. 2014), PP 58-59.

[8] **RD Sarva Jagannada Reddy** (2014), Supporting Evidences To the Exact Pi Value from the Works Of Hippocrates Of Chios, Alfred S. Posamentier And Ingmar Lehmann. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 2 Ver. II (Mar-Apr. 2014), PP 09-12
[9] **RD Sarva Jagannada Reddy** (2014), New Pi Value: Its Derivation and Demarcation of an Area of Circle Equal to Pi/4 in A Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 - 4759. Volume 2 Issue 5, May. 2014, PP-33-38.
[10] **RD Sarva Jagannada Reddy** (2014), Pythagorean way of Proof for the segmental areas of one square with that of rectangles of adjoining square. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. III (May-Jun. 2014), PP 17-20.
[11] **RD Sarva Jagannada Reddy** (2014), Hippocratean Squaring Of Lunes, Semicircle and Circle. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. II (May-Jun. 2014), PP 39-46
[12] **RD Sarva Jagannada Reddy** (2014), Durga Method of Squaring A Circle. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 14-15
[13] **RD Sarva Jagannada Reddy** (2014), The unsuitability of the application of Pythagorean Theorem of Exhaustion Method, in finding the actual length of the circumference of the circle and Pi. International Journal of Engineering Inventions. e-ISSN: 2278-7461, p-ISSN: 2319-6491, Volume 3, Issue 11 (June 2014) PP: 29-35.
[14] **R.D. Sarva Jagannadha Reddy (2014).** Pi treatment for the constituent rectangles of the superscribed square in the study of exact area of the inscribed circle and its value of Pi (SV University Method*). IOSR Journal of Mathematics (IOSR-JM), e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. I (Jul-Aug. 2014), PP 44-48.
[15] **RD Sarva Jagannada Reddy** (2014), To Judge the Correct-Ness of the New Pi Value of Circle By Deriving The Exact Diagonal Length Of The Inscribed Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 – 4759, Volume 2 Issue 7, July. 2014, PP-01-04.
[16] **RD Sarva Jagannadha Reddy (2014)** The Natural Selection Mode To Choose The Real Pi Value Based On The Resurrection Of The Decimal Part Over And Above 3 Of Pi (St. John's Medical College Method). International Journal of Engineering Inventions e-ISSN: 2278-7461, p-ISSN: 2319-6491 Volume 4, Issue 1 (July 2014) PP: 34-37
[17] **R.D. Sarva Jagannadha Reddy (2014).** An Alternate Formula in terms of Pi to find the Area of a Triangle and a Test to decide the True Pi value (Atomic Energy Commission Method) IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. III (Jul-Aug. 2014), PP 13-17
[18] **RD Sarva Jagannadha Reddy (2014)** Aberystwyth University Method for derivation of the exact π value. International Journal of Latest Trends in Engineering and Technology (IJLTET) Vol. 4 Issue 2 July 2014, ISSN: 2278-621X, PP: 133-136.
[19] **R.D. Sarva Jagannadha Reddy (2014).** A study that shows the existence of a simple relationship among square, circle, Golden Ratio and arbelos of Archimedes and from which to identify the real Pi value (Mother Goddess Kaali Maata Unified method). IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. III (Jul-Aug. 2014), PP 33-37
[20] **RD Sarva Jagannadha Reddy** (2015). The New Theory of the Oneness of Square and Circle. International Journal of Engineering Sciences & Research Technology, 4.(8): August, 2015, ISSN: 2277-9655, PP: 901-909.
[21] **RD Sarva Jagannadha Reddy** (2015). Leonardo Da Vinci's Ingenious Way of Carving One-Fourth Area of A Segment in A Circle. International Journal of Engineering Sciences & Research Technology, 4.(10): October, 2015, ISSN: 2277-9655, PP: 39-47.
[22] **RD Sarva Jagannadha Reddy** (2015). Symmetrical division of square and circle (into 32) is reflected by the correct decimal part of the circumference (0.14644660941…) of circle having unit diameter. International Journal of Engineering Sciences & Research Technology, 4.(11): November, 2015, ISSN: 2277-9655, PP: 568-573.
[23] **RD Sarva Jagannadha Reddy** (2015). Doubling the cube in terms of the new Pi value (a Geometric construction of cube equal to 2.0001273445). International Journal of Engineering Sciences & Research Technology, 4.(11): November, 2015, ISSN: 2277-9655, PP: 618-622.
[24] **RD Sarva Jagannadha Reddy** (2015), Pi of the Circle (III Volumes), at www.rsjreddy.webnode.com.

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YET ANOTHER PROOF FOR BAUDHAYANA THEOREM (PYTHAGOREAN THEOREM) OR THE DIAGONAL LENGTH IN TERMS OF PI

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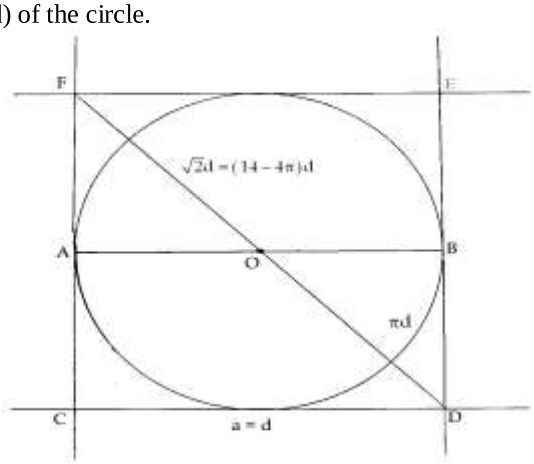
ABSTRACT
There are around 370 proofs for the Pythagorean theorem. In this paper Pi of the circle demarcates a length equal to the diagonal of its superscribed square and gives value in terms of the real Pi. It is also one more proof to identify the real Pi value.

KEYWORDS: Circle, circumference, diameter, diagonal, Pi constant, side, square;.

INTRODUCTION
Pythagorean theorem is 2500 years old. However, on survey of the literature it is found authoritatively that this concept is **much older** and was referred in ancient Indian literature. The current thinking in the mathematical circles is that the square, square root two etc. are **unrelated to the circle** and its π number. In this work, the length of the diagonal of square is derived from the inscribed circle's circumference. It is **revolutionary in its nature** and any concept which is very radical from the accepted norms will **invite vehement opposition.** This paper in its manuscript form when it was sent to the honourable Professors for comments, it was said that it is lacking in proof. This author humbly submits, the opinion of one author from Madras University, India, the role of intuition, in the mathematical world.

"Ramanujan had no formal education in Mathematics. He left his proofs lacking rigour. But pioneers and path-finders, exploring boldly new terrains of mathematical thought, permit themselves a freedom in their attack on a mathematical problem. Their intuition often provides them with an innate feeling for what is correct and what is not" (Page No-192).
*- **T.S. Bhanu Murthy**, A Modern Introduction to Ancient Indian Mathematics, 2nd Edn. New Age International Publishers, 2009, New Delhi.*

Procedure:
Draw a circle with diameter d. Four equidistant tangents on the circle result in the creation of a square and it's two diagonals. The length of the diagonal is easy to find out. In this construction the diagonal length can **also** be obtained in terms of the circumference (πd) of the circle.



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Centre = O
Diameter = AB = d = a
Square = CDEF
Side = CD = a = d
Diagonal DF = $\sqrt{2}$ d = $\sqrt{2}$ a
Diagonal = Known value = $\sqrt{2}$ d = $\sqrt{2}$ a

Proposed value in terms of π = (14 – 4π)d
When (14 – 4π)d = $\sqrt{2}$ d

then $\pi = \dfrac{14-\sqrt{2}}{4}$

The sum of the 4 lengths of the inscribed circle's circumferences (4πd), when deducted from the sum of the lengths of 14 sides of its circumscribed square, the length which remains after deduction, is equal to, the diagonal of that square.

14 sides (14 a = 14d) – 4πd = Diagonal $\left(\sqrt{2}\mathrm{d} = \sqrt{2}\mathrm{a}\right)$

The circumference, thus, demarcates a **diagonal length** on the sides of its circumscribed square. This concept can either be taken as yet another proof for Pythagorean theorem or an alternative to Pythagorean theorem and also a proof for the **exactness** of the length of the circumference of its inscribed circle (πd).

The square is created here as 4 equidistant tangents of the circle. It is another evidence that $\sqrt{2}$ is also created by the circle along with the square. In other words, $\sqrt{2}$ **is a hidden component of the circle.** God has been very kind this afternoon of 03.12.2015, though this author has been seeing the above diagram from March 1998, thousands of times, but never even dreamt of this idea. Kindly share this mathematical truth and **thank God,** please !

Post script
The author of Pythagorean theorem was Pythagoras who was born in Samos around 572 B.C. There is one **recorded** evidence that **this idea** was there around 200 years earlier to Pythagoras and can be looked at the following extract of the book of Bibhutibhushan Datta and Avadesh Narayan Singh (2015), **History of Hindu Mathematics,** Vol. II, Page Nos. 204, 205 & 206, Bharatiya Kala Prakasam, Delhi. (Archimedes was killed by a foreign solider. It is understandable. Hippasus of Metapontum was drowned by fellow Pythagoreans. If this were to be a true one the integrity of the Pythagorean school itself becomes doubtful. Real **truth seekers never harm** even criminals leave alone fellow scholars). Naming of this great concept in the honour of Pythagoras may kindly be rectified; and **requested the Mathematical establishment** by this author, to **rename** in the honour of Baudhayana of 800 B.C. For more details of the work of this author, log in www.rsjreddy.webnode.com

20. RATIONAL TRIANGLES

Rational Right Triangles: Early Solutions. The earliest Hindu solutions of the equation

$$x^2 + y^2 = z^2 \tag{1}$$

are found in the *Sulba*. Baudhâyana (*c.* 800 B.C.), Âpastamba and Kâtyâyana (*c.* 500 B.C.)[1] give a method for the transformation of a rectangle into a square, which is the equivalent of the algebraical identity

$$mn = \left(m - \frac{m-n}{2}\right)^2 - \left(\frac{m-n}{2}\right)^2,$$

where m, n are any two arbitrary numbers. Thus we get

$$(\sqrt{mn})^2 + \left(\frac{m-n}{2}\right)^2 = \left(\frac{m+n}{2}\right)^2.$$

Substituting p^2, q^2 for m, n respectively, in order to eliminate the irrational quantities, we get

$$p^2q^2 + \left(\frac{p^2-q^2}{2}\right)^2 = \left(\frac{p^2+q^2}{2}\right)^2,$$

which gives a rational solution of (1).

For finding a square equal to the sum of a number of other squares of the same size, Kâtyâyana gives a very elegant and simple method which furnishes us with another solution of the rational right triangle. Kâtyâyana says:

"As many squares (of equal size) as you wish to combine into one, the transverse line will be (equal to) one less than that; twice a side will be (equal to) one more than that; (thus) form (an isosceles) triangle. Its arrow (*i.e.*, altitude) will do that."[2]

[1] *BŚl*, i. 58; *ApŚl*, ii. 7; *KŚl*, iii. 2. For details of the construction see Datta, *Śulba*, pp. 83f, 178f.
[2] *KŚl*, vi. 5; Compare also its *Pariśiṣṭa*, verses 40-1.

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Thus for combining n squares of sides a each, we form the isosceles triangle ABC, such that $AB = AC = (n+1)a/2$,

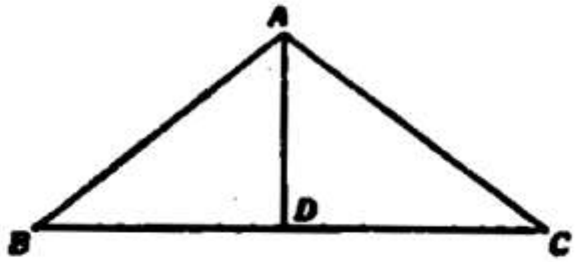

Fig. 2

and $BC = (n-1)a$. Then $AD^2 = na^2$. This gives the formula

$$a^2(\sqrt{n})^2 + a^2\left(\frac{n-1}{2}\right)^2 = a^2\left(\frac{n+1}{2}\right)^2$$

Putting m^2 for n in order to make the sides of the right-angled triangle free from the radical, we have

$$m^2a^2 + \left(\frac{m^2-1}{2}\right)^2 a^2 = \left(\frac{m^2+1}{2}\right)a^2,$$

which gives a rational solution of (1).

Tacit assumption of the following further generalisation is met with in certain constructions described by Āpastamba :[1]

If the sides of a rational right triangle be increased by any rational multiple of them, the resulting figure will be a right triangle.

In particular, he notes

$$3^2 + 4^2 = 5^2,$$
$$(3 + 3\cdot 3)^2 + (4 + 4\cdot 3)^2 = (5 + 5\cdot 3)^2,$$
$$(3 + 3\cdot 4)^2 + (4 + 4\cdot 4)^2 = (5 + 5\cdot 4)^2;$$

[1] *ĀpŚl*, v. 3, 4. Also compare Datta, *Śulba*, pp. 65f

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$$5^2 + 12^2 = 13^2,$$
$$(5 + 5.2)^2 + (12 + 12.2)^2 = (13 + 13.2)^2.$$

Âpastamba also derives from a known right-angled triangle several others by changing the unit of measure of its sides and vice versa.[1] In other words, he recognised the principle that if (α, β, γ) be a rational solution of $x^2 + y^2 = z^2$, then other rational solutions of it will be given by $(l\alpha, l\beta, l\gamma)$, where l is any rational number. This is clearly in evidence in the formula of Kâtyâyana in which a is any quantity. It is now known that all rational solutions of $x^2 + y^2 = z^2$ can be obtained without duplication in this way.

Later Rational Solutions. Brahmagupta (628) says:

"The square of the optional (*iṣṭa*) side is divided and then diminished by an optional number; half the result is the upright, and that increased by the optional number gives the hypotenuse of a rectangle."[2]

In other words, if m, n be any two rational numbers, then the sides of a right triangle will be

$$m, \ \tfrac{1}{2}\left(\frac{m^2}{n} - n\right), \ \tfrac{1}{2}\left(\frac{m^2}{n} + n\right).$$

The Sanskrit word *iṣṭa* can be interpreted as implying "given" as well as "optional". With the former meaning the rule will state how to find rational right triangles having a given leg. Such is, in fact, the interpretation which has been given to a similar rule of Bhâskara II.[3]

[1] Datta, *Sulba*, p. 179. [2] *BrSpSi*, xii. 35.
[3] *Vide infra* p. 211; H. T. Colebrooke, *Algebra with Arithmetic and Mensuration from the Sanscrit of Brahmegupta and Bhascara*, London, 1817, (referred to hereafter as, Colebrooke, *Hindu Algebra*), p. 61 footnote.

CONCLUSION

In this paper, there is yet another proof for Bhaudhayana theorem popularly known as Pythagorean theorem. The exact diagonal length is derived from the **exact** length of the inscribed circle's circumference. This way, a well established Baudhayana theorem **supports the March 1998 π value, as the True π value.**

REFERENCES

[1] **Lennart Berggren, Jonathan Borwein, Peter Borwein** (1997), Pi: A source Book, 2nd edition, Springer-Verlag Ney York Berlin Heidelberg SPIN 10746250.
[2] **Alfred S. Posamentier & Ingmar Lehmann** (2004), π, A Biography of the World's Most Mysterious Number, Prometheus Books, New York 14228-2197.
[3] **David Blatner,** *The Joy of Pi* (Walker/Bloomsbury, 1997).
[4] **William Dunham** (1990), Journey through Genius, Penguin Books USA.
[5] **Richard Courant et al** (1996) What is Mathematics, Oxford University Press.
[6] **RD Sarva Jagannada Reddy** (2014), New Method of Computing Pi value (Siva Method). IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 48-49.
[7] **RD Sarva Jagannada Reddy** (2014), Jesus Method to Compute the Circumference of A Circle and Exact Pi Value. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. I. (Jan. 2014), PP 58-59.
[8] **RD Sarva Jagannada Reddy** (2014), Supporting Evidences To the Exact Pi Value from the Works Of Hippocrates Of Chios, Alfred S. Posamentier And Ingmar Lehmann. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 2 Ver. II (Mar-Apr. 2014), PP 09-12
[9] **RD Sarva Jagannada Reddy** (2014), New Pi Value: Its Derivation and Demarcation of an Area of Circle Equal to Pi/4 in A Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 - 4759. Volume 2 Issue 5, May. 2014, PP-33-38.
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[11] **RD Sarva Jagannada Reddy** (2014), Hippocratean Squaring Of Lunes, Semicircle and Circle. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. II (May-Jun. 2014), PP 39-46
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[24] **RD Sarva Jagannadha Reddy** (2015), Pi of the Circle (III Volumes), at www.rsjreddy.webnode.com.

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THE EQUALIZATION OF CERTAIN RECTANGLES OF SQUARE INTO ITS CIRCLE IN AREA

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ABSTRACT

Circle-square composite construction is very common geometrical entity. The area of the square is very easy to arrive at with the formula a^2. But, it was very difficult till March 1998 to find the area of the circle of an inscribed circle in a square. By the grace of God, in this paper, an impossible concept i.e. finding the area of inscribed circle, is done very easily now from the circle's superscribed square.

KEYWORDS— Circle, circumference, diameter, diagonal, radius, rectangle, side, square.

INTRODUCTION (BAYESIAN TECHNIQUE)

The square is a tetragon having four equal sides. A square can be divided into many rectangles. The area of each rectangle can be calculated. It is very common. In this paper, however, each **constituent rectangle of a square is equated to π.** The constant π is nothing to do with the square. This was the opinion of every mathematician till March 1998.

This author, a Zoology teacher cum student, after the discovery of the real π value, equal to $\frac{14-\sqrt{2}}{4}$ = 3.14644660941… is able to equate the constituent rectangles of a square, into π constant, **exactly**. It is a well known fact, that the area of the circle is equal to $\frac{\pi d^2}{4}$, where 'd' is the diameter. When the diameter is one, the area of that circle becomes equal to $\frac{\pi}{4}$. The side of the circumscribed square is also equal to one, like the diameter, and hence, the area of this square, is equal to one.

In this paper, we find, the square is divided into 9 rectangles and are equated in terms of π. **It is a new approach.** This way the areas of its inscribed circle equal to $\frac{\pi}{4}$ is obtained in terms of the areas of rectangles and π value, thus derived, from those rectangles, give π value as $\frac{14-\sqrt{2}}{4}$, and surprisingly, not the 2000-year old 3.14159265358….

Procedure:

1. **Square**: ABCD, Side = a = diameter = d
2. Diagonals: AC = BD = $\sqrt{2}$ a = $\sqrt{2}$ d
3. Parallel side to side DC = FK = a = d
4. **Circle:** Centre = 0, Radius = OG = OJ = $\frac{a}{2} = \frac{d}{2}$
5. **Triangle:** GOJ, GJ = Hypotenuse = OG x $\sqrt{2}$

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$$= \frac{a}{2} \times \sqrt{2} = \frac{\sqrt{2}a}{2} = \frac{\sqrt{2}d}{2}$$

6. FG = DF = JK = KC = $\frac{\text{side} - \text{hypotenuse}}{2}$

$$= \left(a - \frac{\sqrt{2}a}{2}\right)\frac{1}{2} = \left(\frac{2-\sqrt{2}}{4}\right)a$$

7. So, CK = $\left(\frac{2-\sqrt{2}}{4}\right)a$

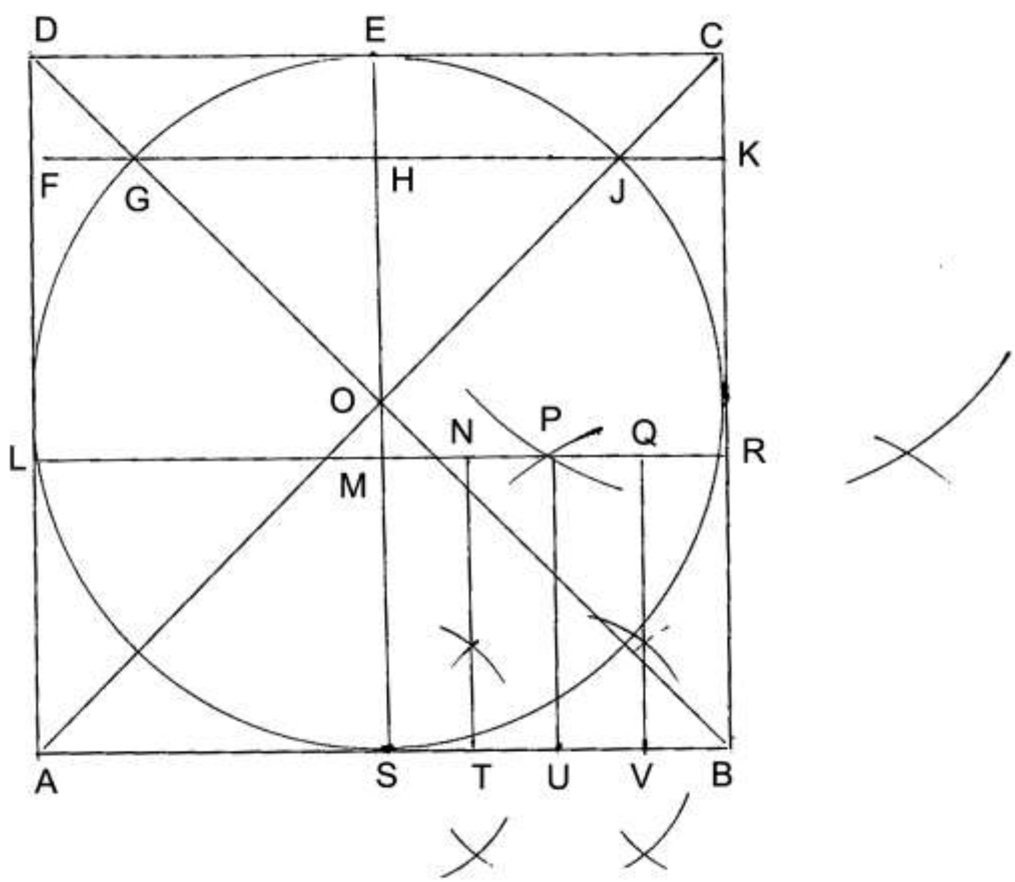
8. KB = Side BC – CK = $a - \left(\frac{2-\sqrt{2}}{4}\right)a = \left(\frac{2+\sqrt{2}}{4}\right)a$

9. So, KB = $\left(\frac{2+\sqrt{2}}{4}\right)a$

10. Bisect KB into KR and RB

$$= \left(\frac{2+\sqrt{2}}{4}\right)a \rightarrow \left(\frac{2+\sqrt{2}}{8}\right)a + \left(\frac{2+\sqrt{2}}{8}\right)a$$

11. Side = AB; Mid point of AB is S



12. AS = SB = $\frac{a}{2}$, Mid point of SB is U
13. SU = UB = $\frac{a}{4}$
14. Bisect SU and UB into ST, TU, UV and VB
15. Side AB = a, so
16. ST = TU = UV = VB = $\frac{a}{8}$
17. ES = Side = a, where E and S are the mid points of DC side and AB Side.
18. H and M are also the mid points of FK side and LR side
19. ABCD square is divided into **two** types of rectangles. They are
20. 1. Two middle sized rectangles DFHE and EHKC
    2. Four larger rectangles FLMH, HMRK, LASM and MSBR
21. Further, the larger rectangle MSBR is divided into four equal smaller rectangles. They are MSTN, NTUP, PUVQ and QVBR
22. So, the entire square ABCD, finally consists of three types of rectangles

    Smaller rectangles = 4
    Middle rectangles = 2
    Larger rectangles = 3
    = 9
23. Areas of rectangles

    Four **smaller** rectangles, each side = ST = $\frac{a}{8}$, SM = $\left(\frac{2+\sqrt{2}}{8}\right)a$

    Area = ST x SM = $\frac{a}{8}\times\left(\frac{2+\sqrt{2}}{8}\right)a = \left(\frac{2+\sqrt{2}}{64}\right)a^2$

    Three **larger** rectangles

    Area = LA x AS = $\left(\frac{2+\sqrt{2}}{8}\right)a\times\frac{a}{2}=\left(\frac{2+\sqrt{2}}{16}\right)a^2$

    Two **middle** sized rectangles

    Area = DF x FH = $\left(\frac{2-\sqrt{2}}{4}\right)a\times\frac{a}{2}=\left(\frac{2-\sqrt{2}}{8}\right)a^2$
24. The sum of the areas of 9 rectangles must be equal to the area of the square ABCD = a^2.

    Four smaller rectangles = $4\left(\frac{2+\sqrt{2}}{64}\right)a^2=\left(\frac{2+\sqrt{2}}{16}\right)a^2$

    Three larger rectangles = $3\left(\frac{2+\sqrt{2}}{16}\right)a^2=\left(\frac{6+3\sqrt{2}}{16}\right)a^2$

    Two middle rectangles = $2\left(\frac{2-\sqrt{2}}{8}\right)a^2=\left(\frac{2-\sqrt{2}}{4}\right)a^2$

    $=\left(\frac{2+\sqrt{2}}{16}\right)a^2+\left(\frac{6+3\sqrt{2}}{16}\right)a^2+\left(\frac{2-\sqrt{2}}{4}\right)a^2=a^2$

PART-II RECTANGLE AREAS ARE EQUATED TO π

In the above Part I, the arithmetical values of rectangles are arrived at. Now, the above same areas of rectangles are **equated** to π constant.

25. Each rectangle is equated in terms π

Each smaller rectangle = $\left(\frac{2+\sqrt{2}}{64}\right)a^2 = \left(\frac{4-\pi}{16}\right)a^2$

Each middle rectangle = $\left(\frac{2-\sqrt{2}}{8}\right)a^2 = \left(\frac{\pi-3}{2}\right)a^2$

Each larger rectangle = $\left(\frac{2+\sqrt{2}}{16}\right)a^2 = \left(\frac{4-\pi}{4}\right)a^2$

26. Area of the ABCD square (in terms of π)

$$= 4\left(\frac{4-\pi}{16}\right)a^2 + 2\left(\frac{\pi-3}{2}\right)a^2 + 3\left(\frac{4-\pi}{4}\right)a^2$$

$$= \left(\frac{4-\pi}{4}\right)a^2 + (\pi-3)a^2 + \left(\frac{12-3\pi}{4}\right)a^2 = a^2$$

27. With the guidance of the known new π value of March 1998, the following rectangles constitute the area of the inscribed circle and the remaining as the four corner areas **in between** circle and square.

2. Middle sized rectangles = $2\left(\frac{2-\sqrt{2}}{8}\right)a^2 = 2\left(\frac{\pi-3}{2}\right)a^2$

+ (plus)

3. Larger rectangles $= 3\left(\frac{2+\sqrt{2}}{16}\right)a^2 = 3\left(\frac{4-\pi}{4}\right)a^2$

$$= \left(\frac{2-\sqrt{2}}{4}\right)a^2 = (\pi-3)a^2$$

$$= \left(\frac{6+3\sqrt{2}}{16}\right)a^2 = \left(\frac{12-3\pi}{4}\right)a^2$$

The sum of these areas of rectangles, is equal to, the area of the circle

$$= \frac{\pi d^2}{4} = \frac{\pi a^2}{4}$$

$$= \left(\frac{2-\sqrt{2}}{4}\right)a^2 + \left(\frac{6+3\sqrt{2}}{16}\right)a^2 = (\pi-3)a^2 + \left(\frac{12-3\pi}{4}\right)a^2$$

$$= \left\{\frac{\left(8-4\sqrt{2}\right)+\left(6+3\sqrt{2}\right)}{16}\right\}a^2 = \left\{\frac{4\pi-12+12-3\pi}{4}\right\}a^2$$

$$= \left(\frac{14-\sqrt{2}}{16}\right)a^2 = \frac{\pi a^2}{4}$$

$$\therefore\ \pi = \frac{14-\sqrt{2}}{4}$$

28. Four smaller rectangles of larger rectangle MSBR, and **each** smaller rectangle of this larger rectangle represents each **corner curvilinear area** of the square, which is outside the inscribed circle, on four corners of the ABCD square.

CONCLUSION

The circle-square composite construction is represented as the sum of 9 rectangles, demarcating exactly, the area of the circle and the four corner areas of the square, outside the inscribed circle.

DISCUSSION

Pi value is derived geometrically by the Exhaustion method of **Eudoxus** of Cnidos (408-355 B.C). Using the same method **Archimedes** of Syracuse (240 B.C.) said π value is **less** than 22/7. Later mathematicians finalized π value as 3.14159265358… geometrically, by **refining** the same Exhaustion method of Eudoxus. From 1450 AD onwards, **infinite series** came which was introduced by **Madhava** of Kerala, India. Thus from Madhava, and independently by **John Wallis** (1660) of England and **James Gregory** (1660) of Scotland till today, with the infinite series of **Simon Plouffe** (1996), 3.14159265358… of Exhaustion method has been **established as final value to π constant.**

Paragraph 2. Thus, from the past to the present, this number: 3.14159265358… has ruled the mathematical world **as Pi of the circle**. The same value has been derived by **Sir Isaac Newton, Leonhard Euler, S.Ramanujan** and about a dozen **great** mathematicians. It has been called a **transcendental number** by **C.L.F. Lindemann.** 3.14159265358… has been **dissociated from the circle** altogether from 1660. However, it was argued, squaring a circle an unsolved geometrical problem. **It is confusing** that π number has been dissociated from the circle, on one hand, and **the impossibility of squaring a circle** with 3.14159265358… has been said again, on the other, going back to the square a circle.

3. **Secondly,** in the Exhaustion method, the so called π number 3.14159265358… is derived from the regular **polygon, involving** $\sqrt{3}$ **.** The same number 3.14159265358… is computed from the infinite series **without using square root extraction.**

4. Geometrically, square root extraction **is a must** in getting 3.14159265358… and in the infinite series, the operation of square root extraction is **vehemently opposed**, and hence, this number 3.14159265358… called **a special** and non rational number as a transcendental number.

5. Thus, the number that was derived from regular polygon and from infinite series, though, **is same**, it is **called differently.** An algebraic number 3.14159265358 of regular polygon with $\sqrt{3}$ derivation, has been **elevated to** the status of a transcendental number, when it is derived from infinite series **without** square root extraction. Again here, we find **contradictory statements**.

6. **Third ambiguity** regarding 3.14159265358… is, **it represents polygon**

$$\frac{\text{Perimeter of polygon}}{\text{Diameter of circle}} = \pi$$

The **original definition** of π is

$$\frac{\text{Circumference of circle}}{\text{Diameter of the same circle}} = \pi$$

Here also, we find 3.14159265358… which is derived from the **polygon-circle hybrid combination.** Hence, 3.14159265358… is **not a pure π value**, in other words, it is a **hybrid π value**.

7. Calling 3.14159265358… as a transcendental number by **C.L.F. Lindemann** is **cent per cent correct.** However, this number is **not Pi of the circle.**

8. C.L.F. Lindemann is **wrong**, if he calls π constant a transcendental number. **Why ?**

9. His proof was based on **Euler's equation** $e^{i\pi} + 1 = 0$.

This equation **accepts** π radians 180^0. But, Euler's equation **rejects π constant 3.14.**

$$e^{\sqrt{-1}\times 180} + 1 = 0 \qquad \text{Right}$$
$$e^{\sqrt{-1}\times 3.14} + 1 = ? \qquad \text{Right or Wrong ?}$$

How can Lindemann incorporate π radians 180^0 in the Euler's equation and give transcendental status to another one i.e. π constant 3.14 ? **Is it not a wrong conclusion ?** His conclusion may be right when
π radians 180^0 = π constant 3.14

Does mathematics accept the above equation ?
Euler's equation accepts π radians 180^0 only. Does this number 180 deserve a transcendental status then ? Thus, this is another one which has conditioned the thinking of mathematicians since 1882, unfortunately.

10. **Yet another confusing** observation is, till March 1998, **nobody knew the real π value.** Without knowing the true π value, how can one say that squaring of circle is an unsolved geometrical problem ? The number 3.14159265358… which **actually** represents polygon and expecting this transcendental number of "circle", and converting it into a square (squaring a circle) is another human created problem which does not exist in geometry.

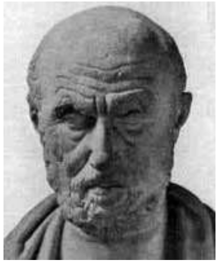
11. Thus, everything done, so far, for 2500 years, has been **attributed to circle,** its value and nature of Pi – and are all questionable statements, except the work of **Hippocrates of Chios** (450 B.C) who squared lunes, squared full circle and also squared semi-circle with the help of lunes. His work alone is cent percent perfect and **excellent**. **It must have disturbed the real thinkers of mathematics, in the past 2500 years.**

12. **The Nature**, must have **dissatisfied** with the prevailing wrong notions on π, and would have **perhaps,** thus chosen a non-mathematician in this author, and revealed to him the real π value $\frac{14-\sqrt{2}}{4}$ an **algebraic number to tell the world,** after keeping this author 26 long years (from 1972 to March 1998) in pensive mood or in gestation period for inculcating in him, to develop **patience** and prepared him for **not to get disturbed** when the **onslaught** on his work and on him personally, would be very extreme and filthy sometimes, due to the intolerance of a few people across the world, as this new value is radical or revolutionary in nature and oppose the whole mathematical world, coming from a layman in mathematics, a Zoology teacher cum student.

13. Everything said about $\frac{14-\sqrt{2}}{4}$ has been questioned and rejected. Every method which derives $\frac{14-\sqrt{2}}{4}$ has been questioned that this method **does not agree** with any known geometrical concepts. Association of circle with $\sqrt{2}$, circle with square, rectangle, triangle, trapezium has been objected.

14. Hence, this author is **not disturbed and distracted** with the indecent comments made on his work and on him personally, by some, but hopes on the Mathematical establishment. It is also said, all the 100+ methods have been passing on **undetectably a mistake** to the next every method.

To sum up, this author is not against the number 3.14159265358… (of polygon). **Attribution** of this number to circle as its circumference **is wrong**. This arrangement is only a stop-gap (= temporary substitute) in character, till the **real** π value is known. Now, the true value is known. **Thank God, Sirs ! Decision is Yours.**



This paper is humbly dedicated to **HIPPOCRATES OF CHIOS** for he alone understood the circle, rightly. He was honoured already as the Founding Father of Mathematics for he authored the first book on Mathematics which became the guidance for Euclid's **Elements**. Hippocrates of Chios should be honoured with **1st Greatest Mathematician** instead of OR in addition to the Founding Father of Mathematics (Now, the real π value 3.14644660941… is known and from this, Archimedes's **prophesy** of value of π equal to **less than** 22/7 = 3.142857142857… proved false).

Author (December 19th 2015)

REFERENCES

[1] **Lennart Berggren, Jonathan Borwein, Peter Borwein** (1997), Pi: A source Book, 2nd edition, Springer-Verlag Ney York Berlin Heidelberg SPIN 10746250.
[2] **Alfred S. Posamentier & Ingmar Lehmann** (2004), π, A Biography of the World's Most Mysterious Number, Prometheus Books, New York 14228-2197.
[3] **David Blatner,** *The Joy of Pi* (Walker/Bloomsbury, 1997).
[4] **William Dunham** (1990), Journey through Genius, Penguin Books USA.
[5] **Richard Courant et al** (1996) What is Mathematics, Oxford University Press.
[6] **RD Sarva Jagannada Reddy** (2014), New Method of Computing Pi value (Siva Method). IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 48-49.
[7] **RD Sarva Jagannada Reddy** (2014), Jesus Method to Compute the Circumference of A Circle and Exact Pi Value. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. I. (Jan. 2014), PP 58-59.

[8] **RD Sarva Jagannada Reddy** (2014), Supporting Evidences To the Exact Pi Value from the Works Of Hippocrates Of Chios, Alfred S. Posamentier And Ingmar Lehmann. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 2 Ver. II (Mar-Apr. 2014), PP 09-12
[9] **RD Sarva Jagannada Reddy** (2014), New Pi Value: Its Derivation and Demarcation of an Area of Circle Equal to Pi/4 in A Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 - 4759. Volume 2 Issue 5, May. 2014, PP-33-38.
[10] **RD Sarva Jagannada Reddy** (2014), Pythagorean way of Proof for the segmental areas of one square with that of rectangles of adjoining square. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. III (May-Jun. 2014), PP 17-20.
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[19] **R.D. Sarva Jagannadha Reddy (2014).** A study that shows the existence of a simple relationship among square, circle, Golden Ratio and arbelos of Archimedes and from which to identify the real Pi value (Mother Goddess Kaali Maata Unified method). IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. III (Jul-Aug. 2014), PP 33-37
[20] **RD Sarva Jagannadha Reddy** (2015). The New Theory of the Oneness of Square and Circle. International Journal of Engineering Sciences & Research Technology, 4.(8): August, 2015, ISSN: 2277-9655, PP: 901-909.
[21] **RD Sarva Jagannadha Reddy** (2015). Leonardo Da Vinci's Ingenious Way of Carving One-Fourth Area of A Segment in A Circle. International Journal of Engineering Sciences & Research Technology, 4.(10): October, 2015, ISSN: 2277-9655, PP: 39-47.
[22] **RD Sarva Jagannadha Reddy** (2015). Symmetrical division of square and circle (into 32) is reflected by the correct decimal part of the circumference (0.14644660941…) of circle having unit diameter. International Journal of Engineering Sciences & Research Technology, 4.(11): November, 2015, ISSN: 2277-9655, PP: 568-573.
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NO MORE SUPER-COMPUTERS TO COMPUTE Pi

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ABSTRACT

The official Pi value 3.14159265358… is proved now an approximate value not from its last decimal place but an approximate value from its very third decimal place onwards. The real Pi value is 3.14644660941…. A simplest formula is revealed by the Nature to derive the true Pi value and is 14 sides of the square minus its diagonal which gives four times of the circumference of this squarer's inscribed circle.

KEYWORDS— Circle, circumference, diameter, diagonal, side, square.

INTRODUCTION

Here is a simple but world-shaking revelation on the exact value of Pi in Mathematics. Till now we have been using Super-computers in the computation of Pi value spending many hours for many days to derive astronomical number of decimals to 3.14159265358… which is an accurate value up to its 2nd decimal only. Unknowingly, it has been believed as accurate approximate till the last decimal place of 3.14159265358… This value has been in vogue for the last 2000 years. The Holy Bible has said Pi value is 3. The first mathematician who found a simple method to compute Pi value is Eudoxus of Cnidos (500 BC) Greece. From his method, Archimedes of Syracuse (240 BC) making more scientific and has said Pi is less than 22/7 = 3.142857142857… After further refinement by later mathematicians of Archimedes's method, the value of Pi came to be known, as 3.14159265358… which we follow even now.

However, from 1450 AD, Madhava of Kerala, India, a new method called infinite series was introduced from which thousands of decimals of Pi became possible. With the advent of Super Computers, Yasumasa Kanada of Department of Computer Science, Tokyo University, Japan has computed trillions of decimals of 3.14159265358… This number was also derived by many great mathematicians and are Sir Issac Newton, Leonhard Euler and S. Ramanujan, a few. It is very unfortunate their number now proved to be false.

In March 1998, the new Pi value was discovered and is (14 – root2)/4. A simple pocket calculator gives 3.14644660941… More than hundred geometrical methods confirm this value. It is an algebraic number. Whereas, the present Pi number is a transcendental number. Thank God ! Very recently a great mathematical truth is seen which gives a very simplest relation among side, diagonal of a square with circumference of its inscribed circle. The relation is : 14 sides – diagonal = 4 circumferences.

In other words 14a – (root2)a = 4 Pi a, where, side (a) is equal to the diameter (d) of its inscribed circle. From the above, Pi value can be derived very easily. A simple calculator is enough. There is no need for Super computers to compute Pi value of circle, as $\sqrt{2}$ (may be a symbol according to some. It is, that **square root** a symbol but **not** square root **two**) though irrational number yet it is an **exact value** $\left(\sqrt{2}\times\sqrt{2}=2\right)$ (for the **accurate approximate value** of 1.4142135623…). Yet another and interesting break- through here is, the inscribed circle demarcates a length equal to diagonal from the sides of the square. From Baudhayana (800 BC) of India and Pythagoras (450 BC) of Greece, it has been believed that a square alone can create a diagonal. But, now it is clear that an inscribed circle in a square too can demarcate a length equal to the diagonal of its superscribed square. This is yet another evidence that circle and square are one.

Let us explain the new formula $14a-\sqrt{2}a=4\pi a$ or $14a-4\pi a=\sqrt{2}a$

Straighten the 14 sides of the square. Rotate the inscribed circle of this square, on its 14 sides. **Turning should be exact**. Then only after 4 full turns of this circle, the length that remaining after 4 full circles, will be equal to **the**

diagonal of the **same** square. **This is a great mathematical truth.** We are fortunate to see this truth after Baudhayana (800 BC) of India and Pythagoras (450 BC) of Greece, who have become famous with so called Pythagorean theorem. So, the **Nature** has revealed another truth to us, **after 2500 years.** Let us **Praise The Lord** of Creation. **It is a divine truth indeed. It does not require any proof.** It is a natural thing like water, air, light, fire, Earth, Sky etc.

Another well known mathematical truth is Pi constant. In the case of π, the number of diameters when arranged one after the other on the straightened circumference of the same circle, a small bit of length which remains after 3 diameters has become **very very very difficult** to measure it and hence it took thousands of years till March 1998 from the inception of human civilization. Archimedes has said this bit of length is equal to less than 1/7. He could not say in another way. At the same time he could not use either 1/6 = 0.16… or 1/8 = 0.125…. as both are **very extremes** to the actual value 0.14… of 3.14... Hence, he couldn't but choose 1/7 and he was **Right** from the existing situation of his time. Further in his days, no concept of 'decimal places' in the number system were known, in the European and Western countries. The number zero, however, was in vogue in the Indian mathematics. Due to communication gap the whole world could know zero, only a few centuries later. So, in the prevailing situation of Archimedes's days, he equated the remaining bit of circumference **after** 3 diameters to 1/7. He did say it was **less than** 1/7 and we should not forget that. Archimedes was perfect.

With the discovery of March 1998 Pi value, it is now very clear, that the meaning for less than 1/7 might be $\frac{1}{4+2\sqrt{2}} = \frac{1}{6.82842712474}$ = 0.14644660941…. However, we have not been using "less than 1/7" but 1/7 itself, in all our calculations. So, to conclude, according to Archimedes's less than $3+\frac{1}{7}=\frac{22}{7}$ should be taken/interpreted/read as

$$3+\frac{1}{4+2\sqrt{2}} = 3+\frac{1}{6.82842712474} = \frac{14-\sqrt{2}}{4} = 3.14644660941\ldots$$

Moreover, this 1/7 actually **represents polygon** and **not** the tail end of the circumference after 3 diameters. **No dispute on it**. It is an universally accepted fact.
If Archimedes were to resurrect from his tomb, he would definitely confirm that his "less than 1/7" of polygon is $\frac{1}{4+2\sqrt{2}}$ for circumference. It is a **New Year Gift** (1st January 2016) to the World, indeed. Let us hope that **every mathematician** who ever sees this truth will light his/her friend/student/neighbor, with this **Divine Truth** which eluded us unfortunately, every one, for 20 centuries. Thus, 20 centuries have gone by. So far so good. Divine Truth doesn't need a human proof/acceptance. Unseen ignorance is pardonable. Now, this truth is like **Rising Morning Sun. Excuse me Sirs**, countdown starts: every second counts! More details are available at www.rsjreddy.webnode.com

CONCLUSION

The true Pi value is 3.14644660941… A very very simplest relation exists between the square and its inscribed circle. This relation between the two: square and its circle, surprises the World of Mathematics, that the Creator runs the Cosmos on very simple mathematical principles.

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THE HINDU

'Pi' stone, an attraction on SVU campus

» TODAY'S PAPER » ANDHRA PRADESH TIRUPATI, November 1, 2011

Hard facts: The huge spherical rock installed on SV University campus in Tirupati. — Photo: K.V. Poornachandra Kumar

Passersby on Sri Venkateswara University campus are sure to stumble upon the huge spherical object that was recently installed in front of the main academic building. Curious onlookers get no idea of what the blank sphere conveys, until they get a bit closer and read the plaque underneath it. It was a humble tribute to his alma mater by a 'converted' math zealot!

R.D. Sarva Jagannatha Reddy is known for finding a new value to the mathematical constant 'pi'. While the value of 'pi' is 22/7 or 3.142, he calls it an 'approximation' at the third decimal, which holds good only for schoolchildren. He found the value as 3.1464466 or (14-Root2)/4. In a review in 'The Mathematical Gazette', Gerry Leversha of St. Paul's School, London refers to this 'extraordinary discovery' and lauds his 'remarkable insight'. Similarly, G. Narendran of Kollam, a life member of Indian Mathematical Society wished that the scientific world would accept the new value. What's more surprising is that Mr. Reddy, who spent 36 years to arrive at the new value, is actually a zoologist! He did his B.Sc Zoology in SVU during 1963-66 and subsequently M.Sc. He attributed his interest in maths to his teachers and offered this sphere as 'Guru Dakshina' to the varsity. He got the sphere made of quality granite, which weighs eight tonnes and measures six feet in diameter. SVU Vice-Chancellor N. Prabhakara Rao got the stone installed in front of the Mathematics department so as to inspire math students to think big. The varsity's plaque however has no mention on the acceptance of the new value.

"Nothing but a sphere can truly represent the spirit and essence of mathematics," Mr. Reddy told *The Hindu* . He hoped that the sphere would remain a source of inspiration for researchers to think beyond the possible.
Zoologist-turned-mathematician R.D. Sarva Jagannatha Reddy installs it to inspire math students to think big

REFERENCES

[1] **Lennart Berggren, Jonathan Borwein, Peter Borwein** (1997), Pi: A source Book, 2nd edition, Springer-Verlag Ney York Berlin Heidelberg SPIN 10746250.
[2] **Alfred S. Posamentier & Ingmar Lehmann** (2004), π, A Biography of the World's Most Mysterious Number, Prometheus Books, New York 14228-2197.
[3] **David Blatner,** *The Joy of Pi* (Walker/Bloomsbury, 1997).
[4] **William Dunham** (1990), Journey through Genius, Penguin Books USA.
[5] **Richard Courant et al** (1996) What is Mathematics, Oxford University Press.
[6] **RD Sarva Jagannada Reddy** (2014), New Method of Computing Pi value (Siva Method). IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 48-49.
[7] **RD Sarva Jagannada Reddy** (2014), Jesus Method to Compute the Circumference of A Circle and Exact Pi Value. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. I. (Jan. 2014), PP 58-59.
[8] **RD Sarva Jagannada Reddy** (2014), Supporting Evidences To the Exact Pi Value from the Works Of Hippocrates Of Chios, Alfred S. Posamentier And Ingmar Lehmann. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 2 Ver. II (Mar-Apr. 2014), PP 09-12
[9] **RD Sarva Jagannada Reddy** (2014), New Pi Value: Its Derivation and Demarcation of an Area of Circle Equal to Pi/4 in A Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 - 4759. Volume 2 Issue 5, May. 2014, PP-33-38.
[10] **RD Sarva Jagannada Reddy** (2014), Pythagorean way of Proof for the segmental areas of one square with that of rectangles of adjoining square. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. III (May-Jun. 2014), PP 17-20.
[11] **RD Sarva Jagannada Reddy** (2014), Hippocratean Squaring Of Lunes, Semicircle and Circle. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. II (May-Jun. 2014), PP 39-46
[12] **RD Sarva Jagannada Reddy** (2014), Durga Method of Squaring A Circle. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 14-15
[13] **RD Sarva Jagannada Reddy** (2014), The unsuitability of the application of Pythagorean Theorem of Exhaustion Method, in finding the actual length of the circumference of the circle and Pi. International Journal of Engineering Inventions. e-ISSN: 2278-7461, p-ISSN: 2319-6491, Volume 3, Issue 11 (June 2014) PP: 29-35.
[14] **R.D. Sarva Jagannadha Reddy (2014).** Pi treatment for the constituent rectangles of the superscribed square in the study of exact area of the inscribed circle and its value of Pi (SV University Method*). IOSR Journal of Mathematics (IOSR-JM), e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. I (Jul-Aug. 2014), PP 44-48.

[15] **RD Sarva Jagannada Reddy** (2014), To Judge the Correct-Ness of the New Pi Value of Circle By Deriving The Exact Diagonal Length Of The Inscribed Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 – 4759, Volume 2 Issue 7, July. 2014, PP-01-04.
[16] **RD Sarva Jagannadha Reddy (2014)** The Natural Selection Mode To Choose The Real Pi Value Based On The Resurrection Of The Decimal Part Over And Above 3 Of Pi (St. John's Medical College Method). International Journal of Engineering Inventions e-ISSN: 2278-7461, p-ISSN: 2319-6491 Volume 4, Issue 1 (July 2014) PP: 34-37
[17] **R.D. Sarva Jagannadha Reddy (2014).** An Alternate Formula in terms of Pi to find the Area of a Triangle and a Test to decide the True Pi value (Atomic Energy Commission Method) IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. III (Jul-Aug. 2014), PP 13-17
[18] **RD Sarva Jagannadha Reddy (2014)** Aberystwyth University Method for derivation of the exact π value. International Journal of Latest Trends in Engineering and Technology (IJLTET) Vol. 4 Issue 2 July 2014, ISSN: 2278-621X, PP: 133-136.
[19] **R.D. Sarva Jagannadha Reddy (2014).** A study that shows the existence of a simple relationship among square, circle, Golden Ratio and arbelos of Archimedes and from which to identify the real Pi value (Mother Goddess Kaali Maata Unified method). IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. III (Jul-Aug. 2014), PP 33-37
[20] **RD Sarva Jagannadha Reddy** (2015). The New Theory of the Oneness of Square and Circle. International Journal of Engineering Sciences & Research Technology, 4.(8): August, 2015, ISSN: 2277-9655, PP: 901-909.
[21] **RD Sarva Jagannadha Reddy** (2015). Leonardo Da Vinci's Ingenious Way of Carving One-Fourth Area of A Segment in A Circle. International Journal of Engineering Sciences & Research Technology, 4.(10): October, 2015, ISSN: 2277-9655, PP: 39-47.
[22] **RD Sarva Jagannadha Reddy** (2015). Symmetrical division of square and circle (into 32) is reflected by the correct decimal part of the circumference (0.14644660941…) of circle having unit diameter. International Journal of Engineering Sciences & Research Technology, 4.(11): November, 2015, ISSN: 2277-9655, PP: 568-573.
[23] **RD Sarva Jagannadha Reddy** (2015). Doubling the cube in terms of the new Pi value (a Geometric construction of cube equal to 2.0001273445). International Journal of Engineering Sciences & Research Technology, 4.(11): November, 2015, ISSN: 2277-9655, PP: 618-622.
[24] **RD Sarva Jagannadha Reddy** (2015). Yet another proof for Baudhayana theorem (Pythagorean Theorem) or the diagonal length in terms of Pi. International Journal of Engineering Sciences & Research Technology, 4.(12): December, 2015, ISSN: 2277-9655, PP: 601-607.
[25] **RD Sarva Jagannadha Reddy** (2015). The Diagonal – circumference-Pi of Simplest Relation. International Journal of Engineering Sciences & Research Technology, 4.(12): December, 2015, ISSN: 2277-9655, PP: 772-776.
[26] **RD Sarva Jagannadha Reddy** (2015), Pi of the Circle (III Volumes), at www.rsjreddy.webnode.com.

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A HIDDEN TRUTH OF SQUARE ROOT TWO IN CIRCLE, AND ITS ESSENTIAL ROLE IN FINDING CIRCUMFERENCE AND AREA OF A CIRCLE (116th Method on Circle and its real Pi)

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ABSTRACT

Area and circumference of circle are calculated with the help of either square or with the help of triangle or with the help of polygon having many sides. In this paper square root 2 is obtained from two circles and area and circumference of circle are calculated from the same square root two of circle.

KEYWORDS— Circle, circumference, side, square, square root two.

INTRODUCTION

Circle is a beautiful geometrical entity, having a radius, which keeps circumference uniformly away from the centre of the circle. Another basic geometrical entity is square. It is a straight-lined entity. Its area and perimeter are calculated with its side (a) using the formulae a^2 and 4a. The area and circumference of circle are calculated with the help of πr^2 and $2\pi r$, where 'r' is radius and π is a constant.

In this paper, two circles create a right angled triangle and consequential length equal to an irrational number $\sqrt{2}/2$. $\sqrt{2}/2$ plays an essential role in finding the area and circumference of circle. So, here one point is very clear. **There is no π, involved here.** Secondly, the diameter and GB length are enough to find the 4 areas of curvilinear segments LH, HBJ, JK and KAL.

PROCEDURE

Draw a circle with centre O and diameter AB. D is the midpoint of OB. Draw a smaller circle with centre D and diameter OB. Draw a tangent AE on the smaller circle which touches the smaller circle at F. Join FD.

1. Diameter AB = d, AO = OB = radius = $\frac{d}{2}$
2. Smaller diameter OB = $\frac{d}{2}$, OD = DF = smaller radius = $\frac{d}{4}$
3. Triangle AFD is a right angled triangle.

   Triangle AFD : AD = AO + OD = $\frac{d}{2}+\frac{d}{4}=\frac{2d+d}{4}=\frac{3d}{4}$

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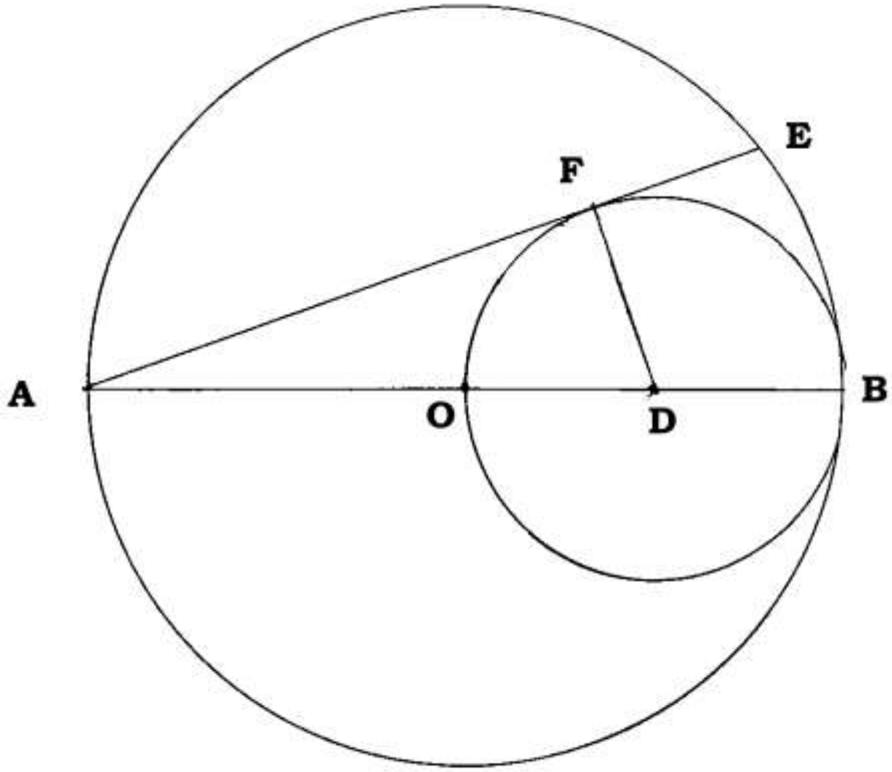

Fig-1

FD = $\frac{d}{4}$; AF = ?

Pythagorean theorem: $AD^2 - FD^2 = AF^2$

$$= \left(\frac{3d}{4}\right)^2 - \left(\frac{d}{4}\right)^2 = AF^2$$

$$AF = \sqrt{\left(\frac{3d}{4}\right)^2 - \left(\frac{d}{4}\right)^2} = \frac{\sqrt{2}d}{2}$$

4. **It is clear that an irrational number $\frac{\sqrt{2}}{2}$ is created by two circles.** In other words, it supports, the new theory that $\sqrt{2}$ is a **hidden truth in circle**. It also gives a clear and first step to find out the length of the circumference of the AB diameter circle, which is larger in size.

5. Fig.2:
AB = diameter, Centre = O

$$AF = \frac{\sqrt{2}d}{2} \text{ of Fig.1 = AF of Fig.2 also = } \frac{\sqrt{2}d}{2}$$

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6. FB = AB – AF = $\left(d-\frac{\sqrt{2}d}{2}\right)=\frac{2d-\sqrt{2}d}{2}$

7. Bisect FB into FG and GB, FG = GB = $\left(\frac{2-\sqrt{2}}{4}\right)d$

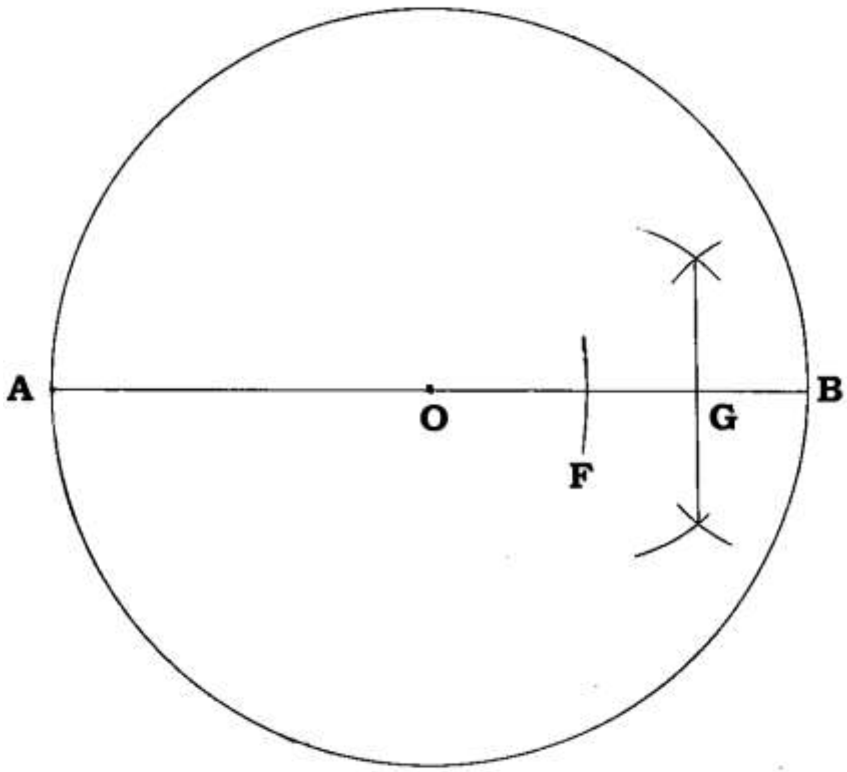

Fig.2

8. Circumference of larger circle whose diameter is 'd' is equal to
3 diameters (3 AB) + GB

$= 3d+\left(\frac{2-\sqrt{2}}{4}\right)d=\left(\frac{14-\sqrt{2}}{4}\right)d$

9. We know formula for circumference of a circle is πd.

Where $\left(\frac{14-\sqrt{2}}{4}\right)d = \pi d$

$$\pi=\frac{\left(\frac{14-\sqrt{2}}{4}\right)d}{d}=\frac{14-\sqrt{2}}{4}$$

Part-B : Area of the Circle

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10. Draw a perpendicular line on AB at G which intersects circumference at H and J. And HJ is surprisingly equal to $\frac{\sqrt{2}d}{2}$

So, AF = HJ = $\frac{\sqrt{2}d}{2}$

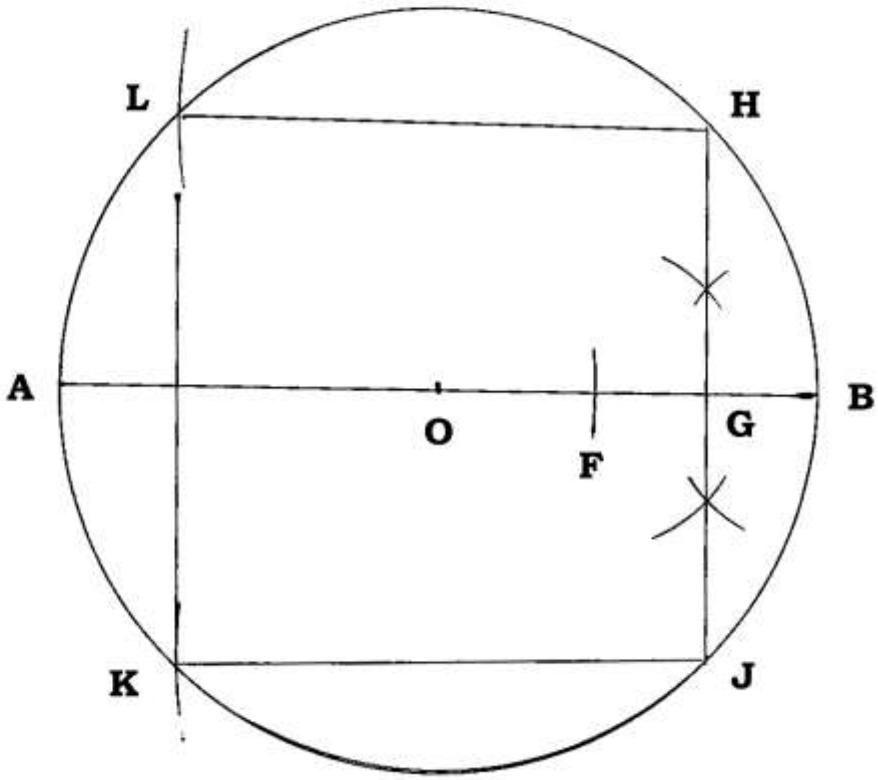

Fig.3

11. HJ is also called as chord of the circle.
12. Four equidistant such HJ chords create a square in the circle

with side = $\frac{\sqrt{2}d}{2}$

Square KJHL, side = KJ = JH = HL = LK = $\frac{\sqrt{2}d}{2}$

Area of the Square = KJHL = LK x KJ = $\frac{\sqrt{2}d}{2} \times \frac{\sqrt{2}d}{2} = \left(\frac{2}{4}\right)d^2 = \frac{d^2}{2}$

13. We know formula for the area of the circle = $\frac{\pi d^2}{4}$
14. The area **in between** the inscribed square KJHL and the circle is
Circle area – Square area

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$$\frac{\pi d^2}{4} - \frac{d^2}{2} = \left(\frac{\pi - 2}{4}\right) d^2$$

15. From S. No. 9 we understand π is equal to $\dfrac{14-\sqrt{2}}{4}$

16. So, the formula for the **in-between area** is $\left(\dfrac{\pi-2}{4}\right)d^2$

17. In Fig.3, we have the following line segments
    (a) Diameter = AB = d
    (b) AF = $\dfrac{\sqrt{2}d}{2}$
    (c) Side of square LKJH = AF = KJ = $\dfrac{\sqrt{2}d}{2}$ and
    (d) GB line segment = $\left(\dfrac{2-\sqrt{2}}{4}\right)d$ of step 7

18. The following formula is based on the **above line segments** for in between area. **Formula for the in-between area**

= $\left(\dfrac{\text{Diameter} + \text{GB length}}{4\,\text{diameters}}\right)$ Square of diameter = $\left(\dfrac{AB+GB}{4AB}\right)AB^2$

$$= \left\{\frac{d + \left(\frac{2-\sqrt{2}}{4}\right)d}{4d}\right\} d^2$$

19. Area of the square = $\left(\dfrac{\sqrt{2}d}{2}\right)^2 = \dfrac{d^2}{2}$

20. Area of the circle = Square area + in between area

$$= \frac{d^2}{2} + \left\{\frac{d + \left(\frac{2-\sqrt{2}}{4}\right)d}{4d}\right\} d^2 = \frac{\pi d^2}{4}$$

$$\therefore \pi = \frac{14-\sqrt{2}}{4}$$

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21. $$\frac{d+\left(\frac{2-\sqrt{2}}{4}\right)d}{4d}=\frac{6-\sqrt{2}}{16}$$

So, $\frac{6-\sqrt{2}}{16}$ is another **circle constant** which, when it is multiplied with **square of the diameter,** gives value to, the **in between area** of square and circle.

CONCLUSION

The length of the **circumference** and **area** of the circle are arrived at, **without using Pi constant**, and are possible with concerned line segments, such as diameter, tangent on a smaller circle etc. In calculating the area of circle, π (= $\left(\frac{14-\sqrt{2}}{4}\right)$) is multiplied with the square of the diameter and divided by 4. Whereas, in finding the in-between area of square and circle, **another new constant** equal to $\frac{6-\sqrt{2}}{16}$ is multiplied with the square of the diameter.

REFERENCES

[1] **Lennart Berggren, Jonathan Borwein, Peter Borwein** (1997), Pi: A source Book, 2nd edition, Springer-Verlag Ney York Berlin Heidelberg SPIN 10746250.

[2] **Alfred S. Posamentier & Ingmar Lehmann** (2004), π, A Biography of the World's Most Mysterious Number, Prometheus Books, New York 14228-2197.

[3] **David Blatner,** *The Joy of Pi* (Walker/Bloomsbury, 1997).

[4] **William Dunham** (1990), Journey through Genius, Penguin Books USA.

[5] **Richard Courant et al** (1996) What is Mathematics, Oxford University Press.

[6] **RD Sarva Jagannada Reddy** (2014), New Method of Computing Pi value (Siva Method). IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 48-49.

[7] **RD Sarva Jagannada Reddy** (2014), Jesus Method to Compute the Circumference of A Circle and Exact Pi Value. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. I. (Jan. 2014), PP 58-59.

[8] **RD Sarva Jagannada Reddy** (2014), Supporting Evidences To the Exact Pi Value from the Works Of Hippocrates Of Chios, Alfred S. Posamentier And Ingmar Lehmann. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 2 Ver. II (Mar-Apr. 2014), PP 09-12

[9] **RD Sarva Jagannada Reddy** (2014), New Pi Value: Its Derivation and Demarcation of an Area of Circle Equal to Pi/4 in A Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 - 4759. Volume 2 Issue 5, May. 2014, PP-33-38.

[10] **RD Sarva Jagannada Reddy** (2014), Pythagorean way of Proof for the segmental areas of one square with that of rectangles of adjoining square. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. III (May-Jun. 2014), PP 17-20.

[11] **RD Sarva Jagannada Reddy** (2014), Hippocratean Squaring Of Lunes, Semicircle and Circle. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. II (May-Jun. 2014), PP 39-46

[12] **RD Sarva Jagannada Reddy** (2014), Durga Method of Squaring A Circle. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 14-15

[13] **RD Sarva Jagannada Reddy** (2014), The unsuitability of the application of Pythagorean Theorem of Exhaustion Method, in finding the actual length of the circumference of the circle and Pi. International Journal of Engineering Inventions. e-ISSN: 2278-7461, p-ISSN: 2319-6491, Volume 3, Issue 11 (June 2014) PP: 29-35.

[14] **R.D. Sarva Jagannadha Reddy (2014).** Pi treatment for the constituent rectangles of the superscribed square in the study of exact area of the inscribed circle and its value of Pi (SV University Method*). IOSR Journal of Mathematics (IOSR-JM), e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. I (Jul-Aug. 2014), PP 44-48.

[15] **RD Sarva Jagannada Reddy** (2014), To Judge the Correct-Ness of the New Pi Value of Circle By Deriving The Exact Diagonal Length Of The Inscribed Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 – 4759, Volume 2 Issue 7, July. 2014, PP-01-04.

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[17] **R.D. Sarva Jagannadha Reddy (2014).** An Alternate Formula in terms of Pi to find the Area of a Triangle and a Test to decide the True Pi value (Atomic Energy Commission Method) IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. III (Jul-Aug. 2014), PP 13-17

[18] **RD Sarva Jagannadha Reddy (2014)** Aberystwyth University Method for derivation of the exact π value. International Journal of Latest Trends in Engineering and Technology (IJLTET) Vol. 4 Issue 2 July 2014, ISSN: 2278-621X, PP: 133-136.

[19] **R.D. Sarva Jagannadha Reddy (2014).** A study that shows the existence of a simple relationship among square, circle, Golden Ratio and arbelos of Archimedes and from which to identify the real Pi value (Mother Goddess Kaali Maata Unified method). IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. III (Jul-Aug. 2014), PP 33-37

[20] **RD Sarva Jagannadha Reddy** (2015). The New Theory of the Oneness of Square and Circle. International Journal of Engineering Sciences & Research Technology, 4.(8): August, 2015, ISSN: 2277-9655, PP: 901-909.

[21] **RD Sarva Jagannadha Reddy** (2015). Leonardo Da Vinci's Ingenious Way of Carving One-Fourth Area of A Segment in A Circle. International Journal of Engineering Sciences & Research Technology, 4.(10): October, 2015, ISSN: 2277-9655, PP: 39-47.

[22] **RD Sarva Jagannadha Reddy** (2015). Symmetrical division of square and circle (into 32) is reflected by the correct decimal part of the circumference (0.14644660941…) of circle having unit diameter. International Journal of Engineering Sciences & Research Technology, 4.(11): November, 2015, ISSN: 2277-9655, PP: 568-573.

[23] **RD Sarva Jagannadha Reddy** (2015). Doubling the cube in terms of the new Pi value (a Geometric construction of cube equal to 2.0001273445). International Journal of Engineering Sciences & Research Technology, 4.(11): November, 2015, ISSN: 2277-9655, PP: 618-622.

[24] **RD Sarva Jagannadha Reddy** (2015). Yet another proof for Baudhayana theorem (Pythagorean Theorem) or the diagonal length in terms of Pi. International Journal of Engineering Sciences & Research Technology, 4.(12): December, 2015, ISSN: 2277-9655, PP: 601-607.

[25] **RD Sarva Jagannadha Reddy** (2015). The Diagonal – circumference-Pi of Simplest Relation. International Journal of Engineering Sciences & Research Technology, 4.(12): December, 2015, ISSN: 2277-9655, PP: 772-776.

[26] **RD Sarva Jagannadha Reddy** (2015), Pi of the Circle (III Volumes), at www.rsjreddy.webnode.com.

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NO MORE A MATHEMATICAL IMPOSSIBILITY – SQUARE ROOT OF Pi FOUND (117th Method)

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ABSTRACT

Pi is a geometrical constant. Its official value is 3.14159265358… March 1998 discovery says Pi value is 3.14644660941…. With the official number square root of Pi and squaring of circle are impossible. With 3.14644660941… root Pi is possible and squaring a circle is also possible and done in this paper.
.

KEYWORDS: Circle, diameter, diagonal, Pi, side, square, square root.

INTRODUCTION

The official π value is 3.14159265358… Actually, it represents regular polygon in and about a circle. The ratio of the perimeter of **polygon** and the diameter of **circle** is now the **accepted definition** of so called π number 3.14159265358… for the last 2000 years and not the ***true definition*** of, the ratio of circumference and diameter of its circle. How ?

$$\frac{\text{Perimeter of the polygon}}{\text{Diameter of the circle (limit)}} = \text{official } \pi \text{ value} = 3.14159265358\ldots$$

From 1450, this value has been supported by infinite series and which is, however, without the involvement of **radius** of circle. We have **concluded** that 3.14159265358… is the correct value. And also, we have decided this number **is final**. By the **grace of God**, like bolt from blue, $\frac{14-\sqrt{2}}{4} = 3.14644660941\ldots$ revealed itself as **π of the circle** i.e. the real/ true and exact π value in March 1998.

Until the new discovery, three things were said about 3.14159265358… They are 1. π is a transcendental number, 2. Squaring of circle is an unsolved geometrical problem (along with the other two: trisection of an arbitrary angle and Duplication of cube) and 3. π value can **not** be obtained exactly.

With the discovery of March 1998 π value 3.14644660941… all the above three things that were said till March 1998, have been proved wrong. The March 1998 π value is an **algebraic number** squaring of circle **is** possible, with this number and the **exact** value to 3.14644660941… is $\frac{14-\sqrt{2}}{4}$.

The new π value is backed by 116 geometrical constructions and are available in www.rsjreddy.webnode.com
Speaking about the concept of squaring of circle, the book **How Round Is Your Circle** authored by John Bryant and Chris Sangwin (2007) in Page 80 & 81, says

"The impossibility of constructing π solves the second classical problem, that of 'squaring the circle'. Given a circle of radius r, can we construct a square with the same area? Since the area of the circle is πr^2, we need to construct the length $\sqrt{\pi}\,r$. This is possible if and only if we can construct π. Since we cannot do this we may not square the circle.

These well-known impossibility proofs are encountered as part of most university undergraduate mathematics degrees. However, there are still those who seek in vain a geometrical construction that will square the circle, duplicate the cube or trisect the angle. Such people sometimes have a good grasp of geometry, and certainly great tenacity. Unfortunately, these attempts are bound to be futile, and the resulting lengthy calculations must inevitably contain at least one error. Professional mathematicians, including the authors, still occasionally receive unsolicited proofs of the impossible. The most recent bundle of papers one of us received arrived by airmail and included a 'proof' using exactly the ruler and compass constructions above, that

$$\pi = \frac{14 - \sqrt{2}}{4}$$

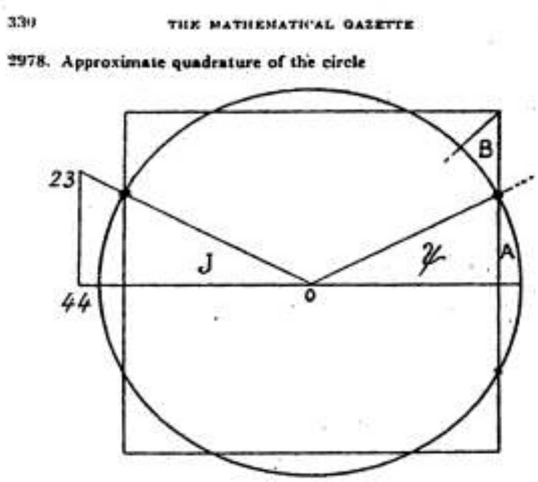
Anyone with a pocket calculator can immediately see that

$$\pi \approx 3.1415926... \neq 3.1464466...$$

which should be enough to suggest strongly that something is amiss. So what should the professional do? Clearly there is not sufficient time to wade through pages of nonsense, carefully correcting the inevitable mistakes. Since we know these constructions have been proved to be impossible, we know without reading the argument that it must be flawed. One option is to ignore such mail, but this may also be a serious error since G. H. Hardy discovered one of the greatest mathematicians, S. Ramanujan, on the strength of an unsolicited bundle of papers and helped obtain for him a fellowship at Cambridge. This is a famous story, told by Hardy in his A Mathematician's Apology (Hardy 1967). Furthermore, to ignore such correspondence confirms any suspicion the authors may have that the professional mathematical establishment is in conspiracy against them. Often this strengthens the resolve of the author who eventually publishes privately, as a newspaper advertisement or even, if the calculations are sufficiently extensive (unfortunately, to them at least, a synonym for 'important'), as a book. When such work is combined with a religious conviction, the result can be far from nourishing to the soul, as anyone who has tried to read such works as MacHuis-dean (1937) can attest." **(By the courtesy of Princeton University Press, Princeton and Oxford)**

So, the above observation of the book is, that, obtaining $\sqrt{\pi}$ is impossible. This "impossible concept" of the World is proved wrong now. What is the reason ? Is it, that the mathematical world has been believing a number i.e. 3.14159265358… the π of the circle ? The answer is "Yes". 3.14159265358… is the number which represents the polygon and **not** the circle. Everything said about based on this number, thus, is **totally** wrong and does not refer to the **real π value**.

Inspite of knowing the common belief of impossibility of getting $\sqrt{\pi}$ mathematicians have been trying to find a geometrical length equal to $\sqrt{\pi}$. The constructions of the four mathematicians are shown below:



1) (By courtesy) Loris Loynes (1961)

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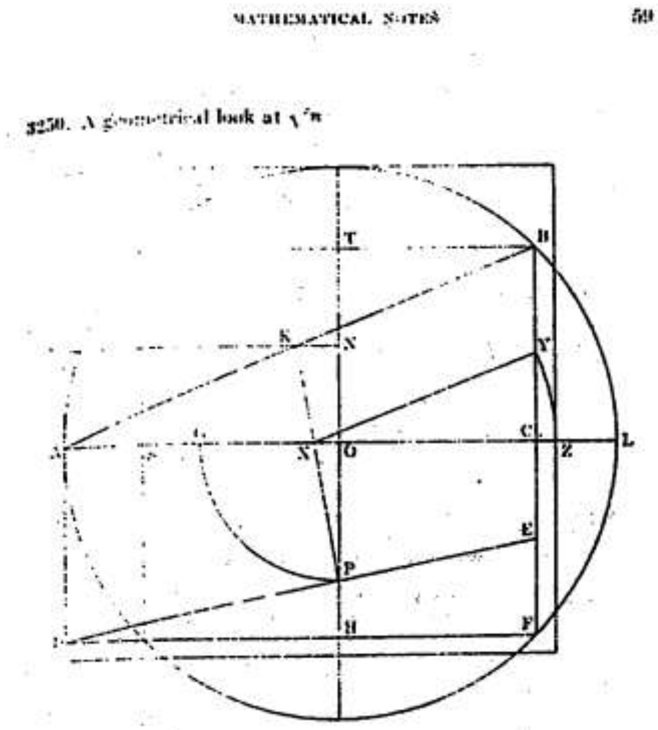
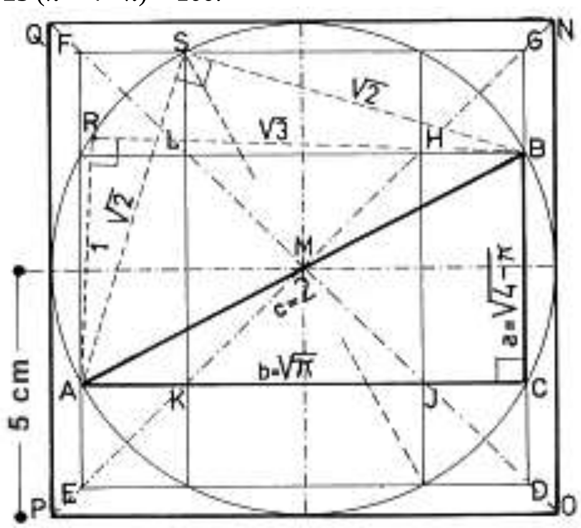
The Mathematical Gazette, UK, Dec. 1961, Page 330



2)(By courtesy) Crockkit Johnson (1970)

The Mathematical Gazette, UK, Feb. 1970, Pages 59 & 60

[5(root-π)]^2 + [5(root-4 - π)]^2 = 25 (π + 4 - π) = 100.



3) (By courtesy) Dr. Ing Helmut Sander (2000)

"A geometrical ensemble to generate the squaring of the circle" Nexus Network Journal, vol. 2 (2000), pp. 83-85.

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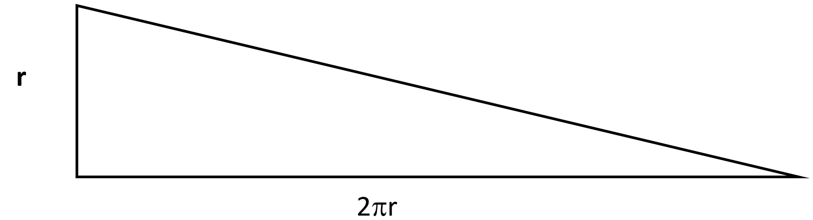
The existence of a length equal to 2πr was seen **intuitively** by Archimedes of Syracuse (240 B.C)



4) Archimedes of Syracuse (240 BC) (Rectification of circumference)

So, the above four great mathematicians could see the reality of the geometrical lengths equal to π and $\sqrt{\pi}$, **but the wrong π number 3.14159265358… has failed them, unfortunately.**

Procedure:

1. Diameter = AB = 2 ; Centre = O
   Radius = OA = OB = 1
   March 1998 Pi value = $\frac{14-\sqrt{2}}{4}$ = 3.14644660941…
2. Perpendicular line (down) on AB at O is OC
   AO = OC = 1
   Triangle AOC
   Hypotenuse = AC = $\sqrt{2}$ = 1.41421356237
3. AC = AD = $\sqrt{2}$
   AB = 2
   DB = AB – AD = 2 – $\sqrt{2}$ = 0.58578643762..
4. Bisect DB
   DE = EB = $\frac{2-\sqrt{2}}{2}$ =0.29289321881
5. AE = AB – EB = $2-\left(\frac{2-\sqrt{2}}{2}\right)=\frac{2+\sqrt{2}}{2}$ = 1.70710678119
6. Bisect AE twice
   AE → AF = EF = $\frac{2+\sqrt{2}}{4}$ = 0.85355339059
   AF → AG = GF = $\frac{2+\sqrt{2}}{8}$ = 0.42677669529
7. GB = AB – AG
   = $2-\left(\frac{2+\sqrt{2}}{8}\right)=\frac{14-\sqrt{2}}{8}$ = 1.57322330471
8. As March 1998 π is equal to = $\frac{14-\sqrt{2}}{4}=3.14644660941$

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then $\frac{14-\sqrt{2}}{8} = \frac{\pi}{2}$

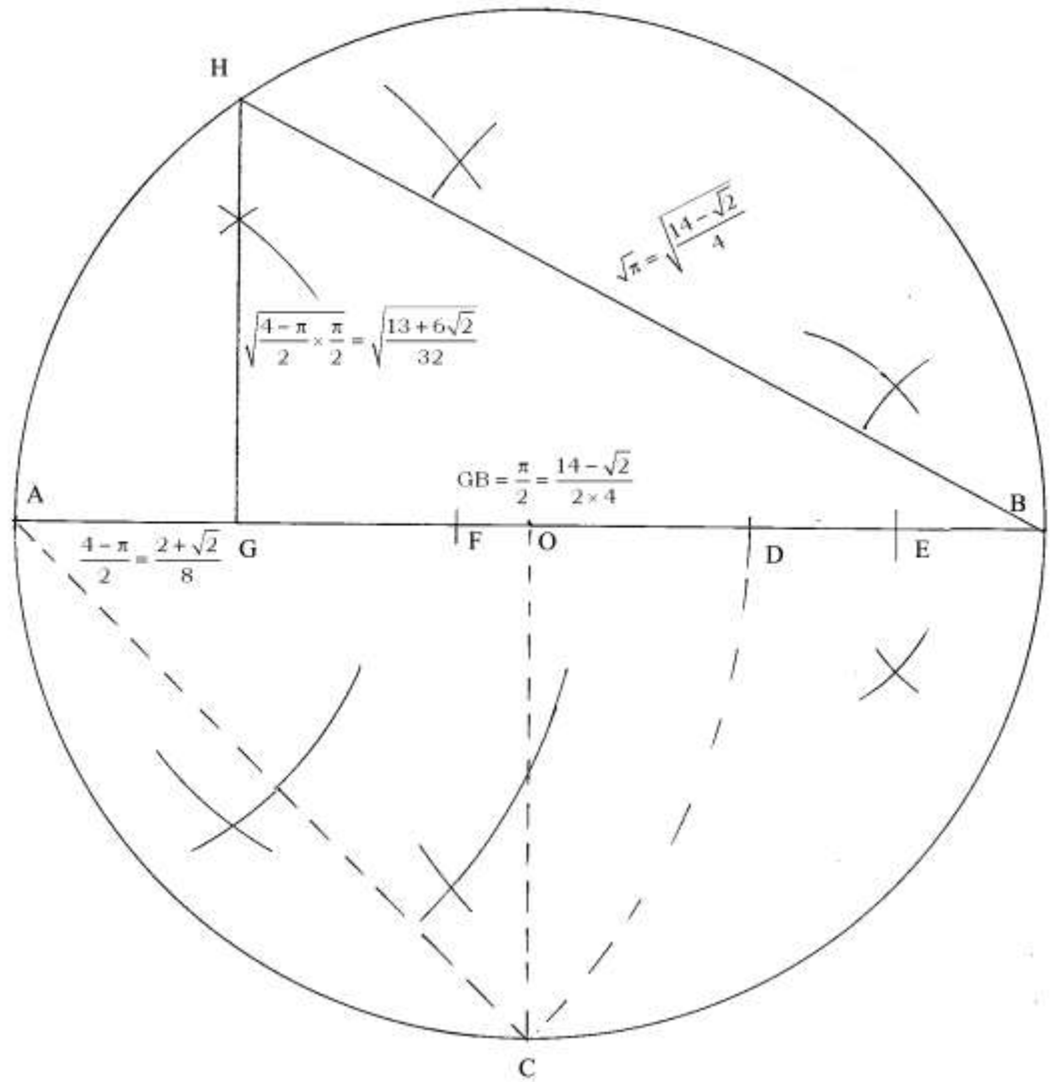
So, GB = $\frac{14-\sqrt{2}}{8} = \frac{\pi}{2}$

9. AG = AB – GB = $2 - \frac{14-\sqrt{2}}{8} = \frac{2+\sqrt{2}}{8}$ = 0.42677669529

10. Draw a perpendicular line on AB at G which meets circle at H.

11. GH = $\sqrt{AG \times GB}$ (on applying Attitude theorem)

$= \sqrt{\frac{2+\sqrt{2}}{8} \times \frac{14-\sqrt{2}}{8}} = \sqrt{\frac{13+6\sqrt{2}}{32}}$ = 0.81939919632



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12. GH = $\sqrt{\dfrac{13+6\sqrt{2}}{32}}$ = 0.81939919632
13. Join HB, which is now a hypotenuse
14. Triangle HGB

GH = $\sqrt{\dfrac{13+6\sqrt{2}}{32}}$

GB = $\dfrac{14-\sqrt{2}}{8}$ (Step.7)

HB = Hypotenuse = $\sqrt{(HG)^2+(GB)^2}$

$$= \sqrt{\left(\frac{13+6\sqrt{2}}{32}\right)^2+\left(\frac{14-\sqrt{2}}{8}\right)^2} = \sqrt{\frac{14-\sqrt{2}}{4}} = 1.77382259806$$

HB is the length equal to $\sqrt{\dfrac{14-\sqrt{2}}{4}}$ = 1.77382259806…. represents $\sqrt{\pi}$ where π is $\dfrac{14-\sqrt{2}}{4}$.

CONCLUSION

As the real π value is known and is proved it as an algebraic number, obtaining the length of square root of Pi is done here.

DEDICATION

This paper is humbly dedicated to Archimedes of Syracuse (240 B.C) Prof. Loris Loynes (1961), Prof. Crockkit Johnson (1970) and Prof. Ing. Helmut Sander (2000).

ACKNOWLEDGEMENTS

This author expresses his many many hearty thanks to the authors **Prof. John Bryant** and **Prof. Chris Sangwin** for their academic boldness in referring the March 1998 Pi value $\dfrac{14-\sqrt{2}}{4}$ in their great book **"How Round Is Your Circle",** and also many many thanks to **Dr. Gerry Leversha,** when thousands of mathematicians across the world, when sent similarly, were unable either to disprove this "extra ordinary discovery" (phrase used while reviewing this author's book by **Dr. Gerry Leversha,** Editor, The Mathematical Gazettee, UK), or reluctant to accept it and maintain silence and untouchability for the reasons of their own, which never enrich mathematics as this truth eluded us since human civilization. This author innocently **thought people would be very happy** for this 43-year search of labour of this discovery. But pained much when he was ridiculed in ungentlemanly and filthy language by some.

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(I2OR), Publication Impact Factor: 3.785

Author

REFERENCES

[1] **Lennart Berggren, Jonathan Borwein, Peter Borwein** (1997), Pi: A source Book, 2nd edition, Springer-Verlag Ney York Berlin Heidelberg SPIN 10746250.

[2] **Alfred S. Posamentier & Ingmar Lehmann** (2004), π, A Biography of the World's Most Mysterious Number, Prometheus Books, New York 14228-2197.

[3] **David Blatner,** *The Joy of Pi* (Walker/Bloomsbury, 1997).

[4] **William Dunham** (1990), Journey through Genius, Penguin Books USA.

[5] **Richard Courant et al** (1996) What is Mathematics, Oxford University Press.

[6] **RD Sarva Jagannada Reddy** (2014), New Method of Computing Pi value (Siva Method). IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 48-49.

[7] **RD Sarva Jagannada Reddy** (2014), Jesus Method to Compute the Circumference of A Circle and Exact Pi Value. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. I. (Jan. 2014), PP 58-59.

[8] **RD Sarva Jagannada Reddy** (2014), Supporting Evidences To the Exact Pi Value from the Works Of Hippocrates Of Chios, Alfred S. Posamentier And Ingmar Lehmann. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 2 Ver. II (Mar-Apr. 2014), PP 09-12

[9] **RD Sarva Jagannada Reddy** (2014), New Pi Value: Its Derivation and Demarcation of an Area of Circle Equal to Pi/4 in A Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 - 4759. Volume 2 Issue 5, May. 2014, PP-33-38.

[10] **RD Sarva Jagannada Reddy** (2014), Pythagorean way of Proof for the segmental areas of one square with that of rectangles of adjoining square. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. III (May-Jun. 2014), PP 17-20.

[11] **RD Sarva Jagannada Reddy** (2014), Hippocratean Squaring Of Lunes, Semicircle and Circle. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. II (May-Jun. 2014), PP 39-46

[12] **RD Sarva Jagannada Reddy** (2014), Durga Method of Squaring A Circle. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 14-15

[13] **RD Sarva Jagannada Reddy** (2014), The unsuitability of the application of Pythagorean Theorem of Exhaustion Method, in finding the actual length of the circumference of the circle and Pi. International Journal of Engineering Inventions. e-ISSN: 2278-7461, p-ISSN: 2319-6491, Volume 3, Issue 11 (June 2014) PP: 29-35.

THOMSON REUTERS ENDNOTE

[Reddy*, 5(1): January, 2016] ISSN: 2277-9655
(I2OR), Publication Impact Factor: 3.785

[14] **R.D. Sarva Jagannadha Reddy (2014).** Pi treatment for the constituent rectangles of the superscribed square in the study of exact area of the inscribed circle and its value of Pi (SV University Method*). IOSR Journal of Mathematics (IOSR-JM), e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. I (Jul-Aug. 2014), PP 44-48.

[15] **RD Sarva Jagannada Reddy** (2014), To Judge the Correct-Ness of the New Pi Value of Circle By Deriving The Exact Diagonal Length Of The Inscribed Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 – 4759, Volume 2 Issue 7, July. 2014, PP-01-04.

[16] **RD Sarva Jagannadha Reddy (2014)** The Natural Selection Mode To Choose The Real Pi Value Based On The Resurrection Of The Decimal Part Over And Above 3 Of Pi (St. John's Medical College Method). International Journal of Engineering Inventions e-ISSN: 2278-7461, p-ISSN: 2319-6491 Volume 4, Issue 1 (July 2014) PP: 34-37

[17] **R.D. Sarva Jagannadha Reddy (2014).** An Alternate Formula in terms of Pi to find the Area of a Triangle and a Test to decide the True Pi value (Atomic Energy Commission Method) IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. III (Jul-Aug. 2014), PP 13-17

[18] **RD Sarva Jagannadha Reddy (2014)** Aberystwyth University Method for derivation of the exact π value. International Journal of Latest Trends in Engineering and Technology (IJLTET) Vol. 4 Issue 2 July 2014, ISSN: 2278-621X, PP: 133-136.

[19] **R.D. Sarva Jagannadha Reddy (2014).** A study that shows the existence of a simple relationship among square, circle, Golden Ratio and arbelos of Archimedes and from which to identify the real Pi value (Mother Goddess Kaali Maata Unified method). IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. III (Jul-Aug. 2014), PP 33-37

[20] **RD Sarva Jagannadha Reddy** (2015). The New Theory of the Oneness of Square and Circle. International Journal of Engineering Sciences & Research Technology, 4.(8): August, 2015, ISSN: 2277-9655, PP: 901-909.

[21] **RD Sarva Jagannadha Reddy** (2015). Leonardo Da Vinci's Ingenious Way of Carving One-Fourth Area of A Segment in A Circle. International Journal of Engineering Sciences & Research Technology, 4.(10): October, 2015, ISSN: 2277-9655, PP: 39-47.

[22] **RD Sarva Jagannadha Reddy** (2015). Symmetrical division of square and circle (into 32) is reflected by the correct decimal part of the circumference (0.14644660941…) of circle having unit diameter. International Journal of Engineering Sciences & Research Technology, 4.(11): November, 2015, ISSN: 2277-9655, PP: 568-573.

[23] **RD Sarva Jagannadha Reddy** (2015). Doubling the cube in terms of the new Pi value (a Geometric construction of cube equal to 2.0001273445). International Journal of Engineering Sciences & Research Technology, 4.(11): November, 2015, ISSN: 2277-9655, PP: 618-622.

[24] **RD Sarva Jagannadha Reddy** (2015). Yet another proof for Baudhayana theorem (Pythagorean Theorem) or the diagonal length in terms of Pi. International Journal of Engineering Sciences & Research Technology, 4.(12): December, 2015, ISSN: 2277-9655, PP: 601-607.

[25] **RD Sarva Jagannadha Reddy** (2015). The Diagonal – circumference-Pi of Simplest Relation. International Journal of Engineering Sciences & Research Technology, 4.(12): December, 2015, ISSN: 2277-9655, PP: 772-776.

[26] **RD Sarva Jagannadha Reddy** (2016). The Equalization of certain rectangles of square into its circle in Area. International Journal of Engineering Sciences & Research Technology, 5.(1): January, 2016, ISSN: 2277-9655, PP: 39-46.

[27] **RD Sarva Jagannadha Reddy** (2016). No more Super-Computers to compute Pi. International Journal of Engineering Sciences & Research Technology, 5.(1): January, 2016, ISSN: 2277-9655, PP: 305-309.

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A GREAT MATHEMATICAL TRUTH : SQUARE ROOT TWO IS AN INVISIBLE PART & PACEL OF CIRCLE (118th Geometrical construction on Real Pi)

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ABSTRACT

Square root two was introduced by Pythagorean Hippasus of Metapontum representing the diagonal of the square. In March 1998, it was discovered that the same square root two, plays an important role in deciding the true value of Pi, too.

KEYWORDS: Circle, diameter, hypotenuse, square root two, triangle..

INTRODUCTION

Circle, square, triangle, regular polygon etc., are important geometrical entities. All entities except circle are straight-lined entities. These dimensions are easily measurable. Whereas, the dimensions of circle, for example, the length of the circumference of circle and the extent of area of the circle, are very very difficult to measure them accurately. Millions of mathematicians in the last many centuries have tried to get exact values for circumference and area of circle. Finally, they have come to the conclusion that π is 3.1415926… and circumference and area of circle can be calculated using formulae, $2\pi r$ and πr^2, where π is 3.1415926… and 'r' is radius, of the circle.

Surprisingly, 3.145926… as π, **was disproved** by the discovery of 3.1464466… and the latter number to be exact, is $\frac{14-\sqrt{2}}{4}$, in March 1998, by this author, a non-mathematician to the core. In the next eighteen years, 117 geometrical methods have confirmed that π no doubt equal to 3.1464466… is correct, and 3.1415926… is an approximation only from its 3rd decimal place on wards. It is a shocking news to this author also.

Main opposition to the new value $\frac{14-\sqrt{2}}{4}$, by the mathematics community is that the significant role of square root two, $\sqrt{2}$ in circle. Any amount of proofs in the last 18 years, as geometrical constructions, **have failed to convince the mathematics community.**

This author, however has been consistently arguing and submitting one by one every time with a new method, that $\frac{14-\sqrt{2}}{4}$ is the **true Pi value**.

Here is the latest **experimental evidence,** for the first time, that square root two, $\sqrt{2}$, is part and parcel of the circle, and how exactly, $\sqrt{2}$ is involved in deriving $\frac{14-\sqrt{2}}{4}$ which was obtained by other 117 earlier methods.

Procedure: Draw a circle and inscribe a triangle.

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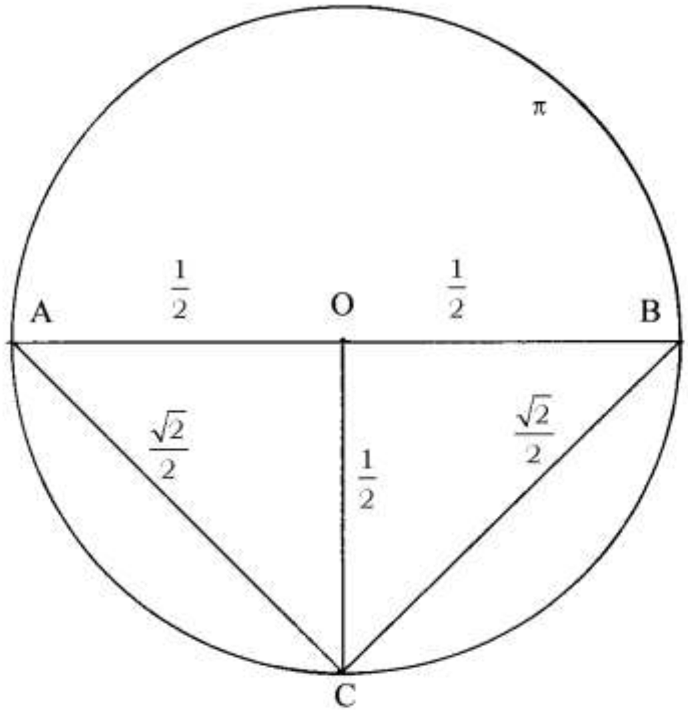

Fig-1

AB = diameter = 1
Circumference = π

$$4\pi + \sqrt{2} = 14$$

AB = Diameter = d = 1

Radius = AO = OB = OC = $\frac{1}{2}$

Triangle ABC
AB = 1

OC = $\frac{1}{2}$

AC = CB = $\frac{\sqrt{2}}{2}$

Circumference = π

The length of the circumference is not known and is represented by π.

$\pi d = \pi \times 1 = \pi$

This author's study of circle and square from 1972 has given the opportunity to him to see **two great mathematical truths,** at two spells, one, on March 1998 (in the derivation of Pi value using radius of the circle only) and the 2nd truth, on December, 2015 in the form of the following equation.

$$4\pi d + \sqrt{2}d = 14d$$

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then $$\pi = \frac{14d - \sqrt{2}d}{4d} = \frac{14 - \sqrt{2}}{4}$$

Explanation of the equation $4\pi d + \sqrt{2}d = 14d$

πd represents the length of the circumference, and 14d represents the sum of 14 diameters of the same circle. This author is happy that he could explain the involvement of $\sqrt{2}d$ here (the square root 2 of the diameter). The equation thus, says that four circumferences **plus** the square root 2 of the diameter is **equal** to the sum of the 14 diameters of same circle. However, **it does require a proof for this statement.** He has only an experimental proof for it. It is like saying an impossible thing (associating $\sqrt{2}$ with circle) as that "Sun rises in the **west**". This may be untrue, but the association of square root 2 with circle is **not an impossible concept** and is, as true as "Sun rises in the East". How ? This author requests the readers to follow him carefully of this experiment done at home with the help of improvised materials.

EXPERIMENTAL PROCEDURE

1. *Take a round cap and measure its diameter (better its diameter minimum 4 cms)*
2. *Mark 14 diameters length on a table or on the edge of a cot (14 d) = FH of Fig.2.*
3. *Turn the cap (looks like hollow cylinder) on the above 14d length,* ***4 times.*** *Mark the end point of 4th completed turn (G in Fig.2)*
4. *Some length (distance) remains uncovered by the cap after 4 turns. Measure its length (Fig.2 GH)*
5. *Add step 3 and step 4.*
   Length of 4 turns + uncovered distance is equal to 14d.

OR

1. *Take the above cap of 4 cms diameter and fold around it, a ribbon of paper 2 cms width* ***one round*** *only (πd) exactly. Cut the piece. Measure its length on the straight edge.*
2. *Multiply 4 times of Step.1 which gives $4\pi d$.*
3. *With pocket calculator find out $\sqrt{2}$ value of the* ***diameter*** *of the cap ($\sqrt{2}d$)*
4. *Add Step 2 and Step 3, which will be equal to 14 diameters of the circle (i.e. cap)*

With minor experimental errors we can prove that $4\pi d + \sqrt{2}d = 14d$

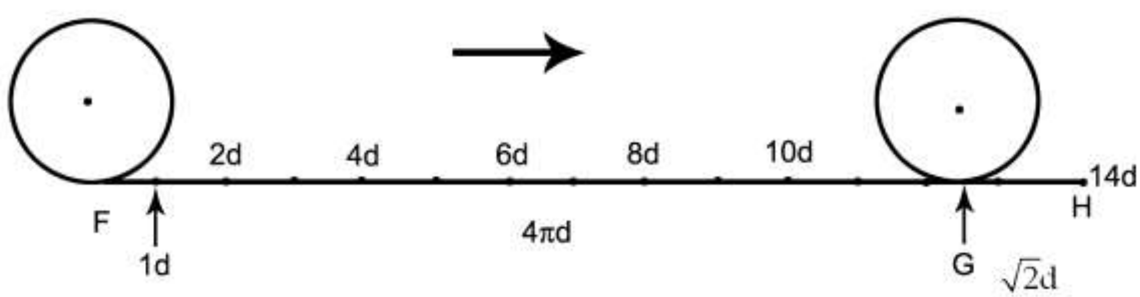

Fig-2: Experimental truth for $4\pi d + \sqrt{2}d = 14d$

(FG) + (GH) = (FH)

FH length = 14 diameters (14 d)
FG length = 4 turns of circle ($4\pi d$)
GH length = FH – FG = 14d – $4\pi d$ = $\sqrt{2}d$

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The above experiment proves that the remaining length after 4 turns (4πd) of (wheel/ cap) the circle on a 14d length, is equal to $\sqrt{2}\text{d}$.

CONCLUSION

The square root two is part and parcel of the circle in its invisible form.

Dedication

This paper is humbly dedicated to Pyathagorean **Hippasus of Metapontum,** Greece, who has discovered $\sqrt{2}$ for the diagonal of the square.

Author

REFERENCES

[1] **Lennart Berggren, Jonathan Borwein, Peter Borwein** (1997), Pi: A source Book, 2nd edition, Springer-Verlag Ney York Berlin Heidelberg SPIN 10746250.
[2] **Alfred S. Posamentier & Ingmar Lehmann** (2004), π, A Biography of the World's Most Mysterious Number, Prometheus Books, New York 14228-2197.
[3] **David Blatner,** *The Joy of Pi* (Walker/Bloomsbury, 1997).
[4] **William Dunham** (1990), Journey through Genius, Penguin Books USA.
[5] **Richard Courant et al** (1996) What is Mathematics, Oxford University Press.
[6] **RD Sarva Jagannada Reddy** (2014), New Method of Computing Pi value (Siva Method). IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 48-49.
[7] **RD Sarva Jagannada Reddy** (2014), Jesus Method to Compute the Circumference of A Circle and Exact Pi Value. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN: 2319-7676. Volume 10, Issue 1 Ver. I. (Jan. 2014), PP 58-59.
[8] **RD Sarva Jagannada Reddy** (2014), Supporting Evidences To the Exact Pi Value from the Works Of Hippocrates Of Chios, Alfred S. Posamentier And Ingmar Lehmann. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 2 Ver. II (Mar-Apr. 2014), PP 09-12
[9] **RD Sarva Jagannada Reddy** (2014), New Pi Value: Its Derivation and Demarcation of an Area of Circle Equal to Pi/4 in A Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 - 4759. Volume 2 Issue 5, May. 2014, PP-33-38.
[10] **RD Sarva Jagannada Reddy** (2014), Pythagorean way of Proof for the segmental areas of one square with that of rectangles of adjoining square. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. III (May-Jun. 2014), PP 17-20.

[11] **RD Sarva Jagannada Reddy** (2014), Hippocratean Squaring Of Lunes, Semicircle and Circle. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 3 Ver. II (May-Jun. 2014), PP 39-46

[12] **RD Sarva Jagannada Reddy** (2014), Durga Method of Squaring A Circle. IOSR Journal of Mathematics, e-ISSN: 2278-3008, p-ISSN:2319-7676. Volume 10, Issue 1 Ver. IV. (Feb. 2014), PP 14-15

[13] **RD Sarva Jagannada Reddy** (2014), The unsuitability of the application of Pythagorean Theorem of Exhaustion Method, in finding the actual length of the circumference of the circle and Pi. International Journal of Engineering Inventions. e-ISSN: 2278-7461, p-ISSN: 2319-6491, Volume 3, Issue 11 (June 2014) PP: 29-35.

[14] **R.D. Sarva Jagannadha Reddy (2014).** Pi treatment for the constituent rectangles of the superscribed square in the study of exact area of the inscribed circle and its value of Pi (SV University Method*). IOSR Journal of Mathematics (IOSR-JM), e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. I (Jul-Aug. 2014), PP 44-48.

[15] **RD Sarva Jagannada Reddy** (2014), To Judge the Correct-Ness of the New Pi Value of Circle By Deriving The Exact Diagonal Length Of The Inscribed Square. International Journal of Mathematics and Statistics Invention, E-ISSN: 2321 – 4767 P-ISSN: 2321 – 4759, Volume 2 Issue 7, July. 2014, PP-01-04.

[16] **RD Sarva Jagannadha Reddy (2014)** The Natural Selection Mode To Choose The Real Pi Value Based On The Resurrection Of The Decimal Part Over And Above 3 Of Pi (St. John's Medical College Method). International Journal of Engineering Inventions e-ISSN: 2278-7461, p-ISSN: 2319-6491 Volume 4, Issue 1 (July 2014) PP: 34-37

[17] **R.D. Sarva Jagannadha Reddy (2014).** An Alternate Formula in terms of Pi to find the Area of a Triangle and a Test to decide the True Pi value (Atomic Energy Commission Method) IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. III (Jul-Aug. 2014), PP 13-17

[18] **RD Sarva Jagannadha Reddy (2014)** Aberystwyth University Method for derivation of the exact π value. International Journal of Latest Trends in Engineering and Technology (IJLTET) Vol. 4 Issue 2 July 2014, ISSN: 2278-621X, PP: 133-136.

[19] **R.D. Sarva Jagannadha Reddy (2014).** A study that shows the existence of a simple relationship among square, circle, Golden Ratio and arbelos of Archimedes and from which to identify the real Pi value (Mother Goddess Kaali Maata Unified method). IOSR Journal of Mathematics (IOSR-JM) e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 10, Issue 4 Ver. III (Jul-Aug. 2014), PP 33-37

[20] **RD Sarva Jagannadha Reddy** (2015). The New Theory of the Oneness of Square and Circle. International Journal of Engineering Sciences & Research Technology, 4.(8): August, 2015, ISSN: 2277-9655, PP: 901-909.

[21] **RD Sarva Jagannadha Reddy** (2015). Leonardo Da Vinci's Ingenious Way of Carving One-Fourth Area of A Segment in A Circle. International Journal of Engineering Sciences & Research Technology, 4.(10): October, 2015, ISSN: 2277-9655, PP: 39-47.

[22] **RD Sarva Jagannadha Reddy** (2015). Symmetrical division of square and circle (into 32) is reflected by the correct decimal part of the circumference (0.14644660941…) of circle having unit diameter. International Journal of Engineering Sciences & Research Technology, 4.(11): November, 2015, ISSN: 2277-9655, PP: 568-573.

[23] **RD Sarva Jagannadha Reddy** (2015). Doubling the cube in terms of the new Pi value (a Geometric construction of cube equal to 2.0001273445). International Journal of Engineering Sciences & Research Technology, 4.(11): November, 2015, ISSN: 2277-9655, PP: 618-622.

[24] **RD Sarva Jagannadha Reddy** (2015). Yet another proof for Baudhayana theorem (Pythagorean Theorem) or the diagonal length in terms of Pi. International Journal of Engineering Sciences & Research Technology, 4.(12): December, 2015, ISSN: 2277-9655, PP: 601-607.

[25] **RD Sarva Jagannadha Reddy** (2015). The Diagonal – circumference-Pi of Simplest Relation. International Journal of Engineering Sciences & Research Technology, 4.(12): December, 2015, ISSN: 2277-9655, PP: 772-776.

[26] **RD Sarva Jagannadha Reddy** (2016). The Equalization of certain rectangles of square into its circle in Area. International Journal of Engineering Sciences & Research Technology, 5.(1): January, 2016, ISSN: 2277-9655, PP: 39-46.

[27] **RD Sarva Jagannadha Reddy** (2016). No more Super-Computers to compute Pi. International Journal of Engineering Sciences & Research Technology, 5.(1): January, 2016, ISSN: 2277-9655, PP: 305-309.

[28] **RD Sarva Jagannadha Reddy** (2016). A Hidden truth of square root two in circle, and its essential role in finding circumference and area of a circle (116th Method on Circle and its real Pi). International Journal of Engineering Sciences & Research Technology, 5.(1): January, 2016, ISSN: 2277-9655, PP: 348-354.

[29] **RD Sarva Jagannadha Reddy** (2016). No more A mathematical impossibility – square root of Pi found (117th Method). International Journal of Engineering Sciences & Research Technology, 5.(1): January, 2016, ISSN: 2277-9655, PP: 429-436.

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Siva Sivaa

A GREAT MATHEMATICAL EXPERIMENT AT HOME

Our high school education never ends without knowing mathematical Pi and its value 22/7. Archimedes (240 B.C.) of Syracuse, Greece has given this value to Pi. 22/7 is equal to 3.1428527… In scientific calculations much accurate Pi value 3.1415926… is being used. Both the values are approximations. The exact value is 3.1464466… = $\frac{14-\sqrt{2}}{4}$. You may do this experiment involving the students. If one does it error-free, the result would be equal to 14d exactly i.e. the sum of 14 lengths of the diameter of the wheel/ cap chosen in the following experiment. The following two mathematical truths appear very very simple. How much effort is there, do you know Sir ?

This author had spent 26 years from 1972, to see the first truth (in March, 1998). The truth is

$$6r + \frac{2r-\sqrt{2}r}{2} = 2\pi r\,; \qquad r\left(\frac{7r}{2} - \frac{\sqrt{2}r}{4}\right) = \pi r^2$$

Millions of mathematicians, in the last 2500 years, had tried but failed to get the above formulae without π and with radius alone for circumference and area of circle, similar to 4a and a^2 in square, 3a and 1/2 ab in triangle.

The following second mathematical truth is seen now after 18 years of study and search which is much simpler than the first. And it is in the form of an equation:

$$4\pi d + \sqrt{2}d = 14d \qquad \text{where d = diameter of circle}$$

$$\text{then } \pi = \frac{14d-\sqrt{2}d}{4d} = \frac{14-\sqrt{2}}{4}$$

There is a convincing proof for the above π value $\frac{14-\sqrt{2}}{4}$ in **Siva method**. But mathematicians have ignored conveniently and is found in Vol. II, **Pi of the Circle** (www.rsjreddy.webnode.com)

The above second mathematical truth of December 2015 has an experimental proof for it. As in Science, **anybody can do this experiment.**

EXPERIMENT: Materials required: Wheel or cap, pocket calculator, straight edge (scale), A4 size paper.

Procedure:

1) Let us take a wheel or round cap of convenient size.
2) Place the cap on the extreme corner of A4 paper and draw the circumference of the cap on the paper.
3) Superscribe a square on circle. Draw two diagonals to get the centre of the circle.
4) Measure the diameter of the circle drawn on the paper.
5) Take the average of three readings of the above diameter of the wheel/ cap.
6) Fold a ribbon of paper of narrow width, just round the circumference of the wheel / cap, **one full round only**.
7) Cut the piece of the ribbon of paper and measure its length (πd) with straight edge (scale).
8) Multiply four times the value (no folding again Sir) and we get 4 πd.
9) With pocket calculator find out square root two of the diameter of the wheel/ cap, $\sqrt{2}$d.
10) The sum of 4 lengths of circumference (4πd) and square root two of the diameter ($\sqrt{2}$d), will be equal to the sum of the 14 lengths of the diameter of the same circle (wheel/ cap), 14d.

Precaution: If the correct diameter is obtained the result would be nearing correct. The measurement of the circumference by folding a paper around a cap / wheel may give values 0.1 cm. accuracy).

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Author (70)

Pi Stone, Dept. of Mathematics, SVU, Tirupati (donated by this author)

Contradictory Statements on Pi

Dear Professor,

Namasthe !

I humbly submit two statements which are contradictory in nature. These two statements are drawn from two books:

1. **What is Mathematics**
   by Richard Courant & Herbert Robbins revised by Ian Stewart
2. **Pi : A Biography of the World's Most Mysterious Number**
   by Alfred S. Posamentier & Ingmar Lehmann

I beg every mathematician – small and big - to put an end to the wrong understanding of Pi – its value and its nature – in view of the **Nature's revelation** of real Pi (14 – root 2)/4 = 3.1464466…

Best regards,
Sincerely
RSJ Reddy
Author

I. Contradictory Statements on π

1. The official π value 3.1415926… is obtained by the **Exhaustion Method** where in a regular polygon is inscribed in a circle, and its sides are doubled progressively till the inscribed polygon touches the circle such that the gap between the two: polygon and circle, is **exhausted** leaving **no gap** in between them. This method was the **sole geometrical method** till 1660 (when infinite series came) and even now.
2. Here is a definition of π from the book 'What is Mathematics' pg. No. 299
   "As is known from school mathematics, the length of the circumference of a circle of unit radius can be defined as the limit of a sequence of lengths of regular polygons with an increasing number of sides. The length of the circumference so defined is denoted by 2π*".*
3. The above same value 3.1415926… is also obtained by adopting the infinite series of **John Wallis** of England and **James Gregory** of

Scotland from 1660 onwards. π constant was **dissociated** from the area/ circumference of circle to its diameter, with the inception of infinite series. 3.1415926 …. has become afterwards **special number** and with the C.L.F. Lindemann's "proof" of 1882, this number (the Pi constant) has been termed as a **transcendental number.**

REGULAR POLYGONS 125

Exercise: Since $2^m \to \infty$, prove as a consequence that

$$\underbrace{\sqrt{2+\sqrt{2+\cdots+\sqrt{2}}}}_{n \text{ square roots.}} \to 2 \quad \text{as} \quad n \to \infty.$$

The results obtained thus far exhibit the following characteristic feature: *The sides of the 2^n-gon, the $5\cdot 2^n$-gon, and the $3\cdot 2^n$-gon, can all be found entirely by the processes of addition, subtraction, multiplication, division, and the extraction of square roots.*

*3. Apollonius' Problem

Another construction problem that becomes quite simple from the algebraic standpoint is the famous contact problem of Apollonius already mentioned. In the present context it is unnecessary for us to find a particularly elegant construction. What matters here is that in principle the problem can be solved by straightedge and compass alone. We shall give a brief indication of the proof, leaving the question of a more elegant method of construction to page 161.

Let the centers of the three given circles have coördinates (x_1, y_1), (x_2, y_2) and (x_3, y_3), respectively, with radii r_1, r_2, and r_3. Denote the center and radius of the required circle by (x, y) and r. Then the condition that the required circle be tangent to the three given circles is obtained by observing that the distance between the centers of two tangent circles is equal to the sum or difference of the radii, according as the circles are tangent externally or internally. This yields the equations

$$(1) \qquad (x - x_1)^2 + (y - y_1)^2 - (r \pm r_1)^2 = 0,$$
$$(2) \qquad (x - x_2)^2 + (y - y_2)^2 - (r \pm r_2)^2 = 0,$$
$$(3) \qquad (x - x_3)^2 + (y - y_3)^2 - (r \pm r_3)^2 = 0,$$

or

$$(1a) \quad x^2 + y^2 - r^2 - 2xx_1 - 2yy_1 \pm 2rr_1 + x_1^2 + y_1^2 - r_1^2 = 0,$$

etc. The plus or minus sign is to be chosen in each of these equations according as the circles are to be externally or internally tangent. (See Fig. 35.) Equations (1), (2), (3) are three quadratic equations in three unknowns x, y, r with the property that the second degree terms are the same in each equation, as is seen from the expanded form (1a). Hence, by subtracting (2) from (1), we get a linear equation in x, y, r:

$$(4) \qquad ax + by + cr = d,$$

where $a = 2(x_2 - x_1)$, etc. Similarly, by subtracting (3) from (1), we get another linear equation,

$$(5) \qquad a'x + b'y + c'r = d'.$$

(Extract from the 1st Book)

an irrational number;[7] in other words, the circumference and the radius of a circle are incommensurable. That means there doesn't exist a common unit of measure that will allow us to measure both the circumference and the radius. This was proved in 1806[8] by the French mathematician Adrien-Marie Legendre (1752–1833)—more than two millennia later!

But even more fascinating is the fact that π cannot be calculated by a combination of the operations of addition, subtraction, multiplication, division, *and square root extraction*. This means π is a type of nonrational number called a transcendental number.[9] This was already suspected by the Swiss mathematician Leonhard Euler (1707–1783),[10] but it was first proved in 1882 by the German mathematician (Carl Louis) Ferdinand Lindemann (1852–1939). Remember, it is sometimes more difficult to prove that something cannot be done than to prove it is possible to be done. Thus, for Lindemann to establish that π could not be produced by a combination of the five operations—addition, subtraction, multiplication, division, and square root extraction—was quite an important contribution to the development of our understanding of mathematics.

The establishment of the transcendence of π extinguished the hopes of all those who sought a method to "square the circle," that is, to construct[11] a square of side s, such that its area equals that of the given circle of radius r. Lindemann killed that hope for all time.

7. An irrational number is one that cannot be expressed as a fraction that has integers in its numerator and denominator.

8. The proof in 1767 by the German mathematician Johann Heinrich Lambert (1728–1777) had a flaw in it.

9. A transcendental number is one that is not the root of a polynomial equation with rational coefficients. Another way of saying this is that it is a number that cannot be expressed as a combination of the four basic arithmetic operations and root extraction. In other words, it is a number that cannot be expressed algebraically. π is such a number.

10. The term *transcendental number* was introduced by Euler.

11. By "construct" we refer to the Euclidean constructions, namely, using a pair of compasses (or as it is commonly called "a compasses") and an unmarked straightedge.

(Excerpt from the 2nd Book)

4. 3.1415926… is same, although it is derived geometrically and from the adoption of infinite series applying the trigonometric relations in both. But, the two statements obtained from the two books are **contradictory**. This is for your kind information, Sir.

To conclude: thus, it is very clear when 3.14159265358… obtained geometrically the operation of addition, subtraction, multiplication and square root extraction is a must, but the same number, when obtained through infinite series it's operation is totally banned and hence it is called a transcendental number. Is it not contradictory between these two books cited above. Which author is right then ?

II. Wrong Pi Number 3.1415926…

Many Professors earlier have raised a well popular belief that

1. 3.1415926… is the Pi value.
2. It is a transcendental number according to the Proof of C.L.F.Lindemann (1882) and
3. Squaring a circle is impossible.

My doubt is that

For 1 = 3.1415926… is not Pi value. It represents the value of the regular polygon inscribed in a circle as its limit. **Here logic plays, and it is not a proof.** Hence, 3.1415926… is the number representing polygon only and not Pi of the circle, definitely.

For 2 = Yes, 3.1415926… is a transcendental number. When it is not Pi value it would become wrong when one calls Pi constant is a transcendental number.

For 3 = When **no body has seen till now the real Pi value, it is wrong to say that Squaring a circle is an Unsolved Geometrical Problem.** Wrong Pi value thus has been chosen and consequential wrong views have been said subsequently.

Part-III

Wrong Approach in the C.L.F. Lindemann's Proof

For 2 = C.L.F. Lindemann has said Pi number (3.1415926… ?) is transcendental number based on the Euler's equation

$$e^{i\pi} + 1 = 0$$

In the above equation π refers to π radians 180^0 and not π constant 3.14.

If π constant is involved in the equation, the Euler's equation itself becomes wrong.

$$e^{i \times 180} + 1 = 0 \quad = \quad \text{Right}$$

$$e^{i\times 3.14}+1=? \quad = \quad \text{Wrong/ Right}$$

It is clear, therefore that **Euler's equation rejects in its fold π constant 3.14.** In other words, π constant 3.14… has **no right of its participation** in the Euler's equation. When this is the reality how can Lindemann say that 3.14 (π constant) is transcendental number, without its being accepted in the Euler's equation itself ?

Are we to accept that π constant 3.14 is identical / same as / equal to, π radians 180^0 ?

Does mathematics accept that

$$\pi \text{ radians } 180^0 = \pi \text{ constant } 3.14..$$

I am a non-mathematician, out of ignorance in the subject, I don't accept. I consider that Lindemann has wrongly interpreted the above Euler's equation. **Do you accept, Sir.**

I support Lindemann still in calling 3.1415926… as a transcendental number, but unfortunately this number is **not** Pi of the circle. It is Pi of the inscribed polygon that does **not** exist in mathematics.

Conclusion:

1. 3.1415926… is not Pi of the circle.
2. This number represents regular polygon inscribed in a circle as its limit.
3. 3.1415926… has been obtained from the **Exhaustion Method** even **before** Archimedes (240 B.C) of Syracuse.
4. It is the only one geometrical method available even now.
5. **No body has tried a second geometrical method** and it is very unfortunate indeed.
6. Limiting principle of Exhaustion method is a **logic** and **not a proof.**
7. Till 1660, this number 3.1415926… was obtained from the Exhaustion method only.
8. From 1660 onwards infinite series came, **in addition,** which too has given the same number 3.1415926…

9. Either in the Exhaustion method or in the infinite series, **trigonometric functions** are applied. So, both are of **same** category. Hence, the value of Exhaustion method became much **stronger** and mathematicians have unfortunately **forgotten** to search for the true/ real/ exact value of Pi.
10. Thus, the entire work on Pi from Archimedes till now has travelled in the **wrong path**. When I said this, some mathematicians ridiculed me, and some gone to the extent of abusing me personally in filthy language. I hope the Hon'ble Professors will avoid harsh words using against me personally and reply me now, on the subject submitted maintaining academic decency.

Further, **Prof. Underwood Dudley,** the author of "Mathematical Cranks", has questioned the truth in the Euler's equation $e^{i\pi}+1=0$ and Lindemann's proof. It is well known the opinion of **Bryan Morgan** (1972) in his book **"Men and Discoveries in Mathematics"** (Page 140) the opinion of **Benjamin Peirce** (1809-1880) of **E. Kasner** and **J. Newman's** book. Here is another statement for the incompleteness.

"The theory of transcendental numbers is, however, far from complete. There is no general criterion that can be utilized to characterize transcendental numbers" – **Encyclopaedic Dictionary of Mathematics,** Japan Mathematical Society (Page 1310).

TO CONCLUDE

On the whole, the work done so far from Archimedes (240 B.C) of Syracase till today is all unfortunately, questionable, and to be frank, wrong. "Silence" prevailing in the mathematics community **now** is not the answer to the wrong done to Pi, so far. **Good work** done on Pi was **stopped** with the squaring of lunes, squaring of semi circle with the help of a lune and squaring of full circle with the help of a lune by **Hippocrates of Chios (450 B.C.),** who is popularly called as the **Founding Father of Mathematics.** Now with the real π value known, in no time literature on it will grow unbounded exceeding the height of Mount Everest the moment when the new Pi value is accepted. Contributions will pour with the light speed from every corner of the world and enrich **Geometry, the physical soul of God.**

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The Instant Speed of an Unknown Radiation by Which the Creator Travels

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Abstract: *It is strongly believed that the speed of the light (c) is constant. Two more constants also never change, and they are gravitational constant (g) and Planck's constant (h). They are the basic concepts that built our Universe. When the understanding of the speed of light is so strong, here is a simple submission to the scientific world that there must be an unknown radiation which travels the infinite distances instantly, at the doubling speed of the preceding speed, at the every unit of 300,000 km per second of light. It is explained through a Thought experiment, which is one way to prove a new concept in Science.*
Keywords: *Everything, light, speed, space, thought experiment*.

I. Introduction

The Visible Universe is very strange and wonderful. Its age, size and beauty are very difficult even to imagine and admire. The correct understanding of the Universe was started with the model of a Polish priest, Nicolaus Copernicus in 1514, with his Heliocentric theory, opposing the then prevailing view of Geocentric theory. Next came the German Johannes Kepler and the Italian Galileo Galilei.

The present ideas about the motion of Celestial bodies had started much stronger and convincing with Issac Newton. Alexander Friedmann's model says all the galaxies are moving directly away from each other. A galaxy of scientists have come next who started explaining the Universe in much clearer way. The place of Classical Physics has been occupied slowly by the Quantum Mechanics. Today scientists describe the Universe in terms of two basic theories – the general theory of relativity of Albert Einstein and the Quantum Mechanics of Max Planck and others. **The eventual goal of Science is to provide a single theory that explains the whole Universe.**

Man understands everything with his small brain located in a 6-foot vertical body. This brain is able to imagine, unimaginably the infinite Cosmos. If that is so, with this proportion of body and mind of man, - if extended – what would be the caliber of the **Cosmic mind (God)** located in this infinite Cosmic body of both visible and invisible physical, celestial bodies which are **specially extended** to form space anew, such that, which result in the consequential origin of "distance" of space. If no two bodies present, there won't exist "distance" between them. So, the Creator has to control the vast Cosmos and it is possible only when God can disappear at one place and reappear at another place, **instantly.** So, it conveys the message to us that "instant speed" is the quality of God, however, may be the long, the distance between the two bodies of space.

For four decades, this author has been thinking about the management of this Cosmos which has no "boundary". He has read very recently many books. Among them one book **The Speed of Time** authored by Sharad Nalawade of Bangalore, has clarified many of his doubts about the concepts of Space, Time, Length, Gravity etc. Still, one doubt persists. And the doubt is "How could God travel instantly to any place in the Cosmos?" It is because, that **the speed of light is constant.** But the known distance of the Cosmos is many thousands of light-years. So, with the limited speed of light and which is constant and is the "highest speed" known, it is impossible to reach destination from one 'boundary' to the opposite 'boundary' of Cosmos. To answer, here is a thought experiment for the doubt.

Thought Experiment

A boy looking at the sky above and questioned himself one day. If one believes that light travels with a speed of 300,000 km per second, and God is the creator of the Cosmos and He is the sole manager who has to look after the well being of every part of the Cosmos, how can He manage the long distance of thousands of light-years. We know the Cosmos is very large, no no **infinite**. Cosmos consists of two entities: Physical Universe and Radiation. Physical Universe is made of Celestial bodies. They are made of matter/ mass. They occupy certain space. The existence of space is perceived only when there is matter / mass. No matter, no concept of "space" comes to our mind. When two bodies are there, the space between the two bodies is called "distance". So, space gets the name of "distance" then. Without matter, the meaning for space is difficult to understand.

The boy imagined then, suppose one after the other, all the Celestial bodies, let them, disappear one by one. First, all galaxies except Milky Way, disappeared. Next, everything in the Milky Way disappeared except

Solar Family. Next, all the planets in the Solar Family disappeared, except the Earth. Finally, the Earth too has disappeared, leaving the boy "standing" in space. What that exists after the disappearance of everything is "Space". It is nothing. No mass. But **Everything has originated from Nothing.** Still, "Space" is not a container. If it were to be a big bowl, Cosmic bowl, next question will be, what is beyond this container ? So, space is not a container. **Albert Einstein** has given a right meaning for Space.

"Physical objects are not in space, but these objects are **spatially extended**. In this way the concept "empty space" loses its meaning".
Albert Einstein
June 9th, 1952

Coming to the earlier **Thought Experiment** of the boy, the Cosmos is of many thousands of light-years dimension. Light has a limited speed. The boy was while thinking thus, how does God manage this infinite Universe by Himself alone with a limited, though fastest, if right, travelling speed of Light ? **Suddenly, a light in the human form appeared before the boy.**

In the mean time a message came unexpectedly to the God that some "accident" had occurred on the other side of the Physical Universe, while the God was with the curious boy discussing about Cosmos.

God took the boy on His shoulder immediately and carried him to the other side of the Universe. The boy was intelligent and he noted the time in his wrist watch before starting. After the business was over at the accidental spot, God brought back the boy, where they had started before. **The God disappeared**. The boy was surprised when he saw his watch showing the time. Just only two minutes had elapsed. The boy could not understand how could the God travel so fast with the limited speed of 300, 000 km per second, so many thousands of light-years of distance ? Impossible.

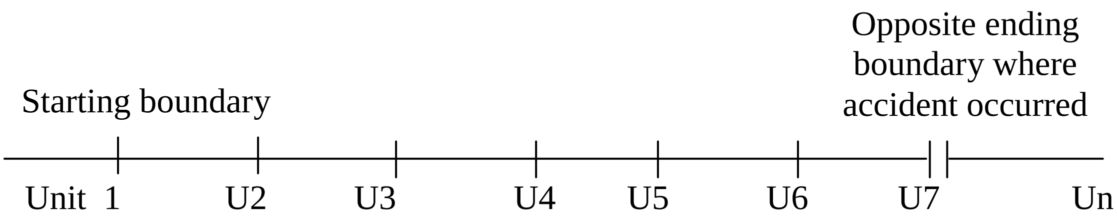
The 'distance' speaks many years for travel. But, actually the boy travelled with God, up and down, **in less than two minutes**. His friends and his members at home, everything was normal to him, as if nothing had happened. No body aged.

The boy thought and thought. Finally, he came to the following conclusion.

1. **Either, the light does not travel with constant speed, and;**
2. **The speed of the light gets doubled successively or;**
3. **There must be another Radiation for God to travel with it.**

The boy looked at the sky above. He was confused much more now. The boy was reminded of Mark Twain, who said **"the more you explain it, the more I don't understand it"**. With light speed it is impossible to cover the distance from one boundary of the Physical Universe to its opposite boundary having a distance of thousands of light-years, in less than two minutes, up and down, he murmured, again and again.

By the blessings of God, at last, he got the following explanation. Let us divide the distance between the two boundaries.



Every unit = 300, 000 km (of light speed)

The God might have travelled every unit of distance of 300,000 km **doubling successively** of the earlier unit. How ?

First unit of distance	=	in 1 second
Second unit of distance	=	in 1/2 second
Third unit of distance	=	in 1/4 second
Fourth unit of distance	=	in 1/8 second
Fifth unit of distance	=	in 1/16 second
Sixth unit of distance	=	in 1/32 second and so on.

So, at every crossing of unit of 300, 000 km, the speed of light gets doubled over the immediate preceding speed. This way, even many thousands of light-years distance takes less than two minutes.

He thanked the God. He bowed before the sky that he got the answer. So, God travels from one boundary of the Physical Universe to the other boundary in less than one minute. It means, God disappears at one place and appears at another place almost **instantaneously** supervising the well being of creation every where (if He goes late taking so many light-years, there is nothing He can do there, at the accidental spot).

II. Conclusion

The Thought Experiment predicts the existence of light with a changing speed and /or the existence of an unknown radiation as the mode of travel with which God travels instantly.

References

[1]. Albert Einstein (1916), Relativity – The Special and the General Theory, General Press, New Delhi.
[2]. Sharad Nalawade (2012), The Speed of Time, WORDIZEN Books, India.
[3]. Stephen Hawking (2005), A Briefer History of Time, Bantam Press, London.
[4]. Stephen Hawking (2006), The Theory of Everything, Phoenix Books, USA.
[5]. Stephen Hawking (2010), The Grand Design, Bantam Press, London.
[6]. Walter Issacson (2007), Einstein, His life and Universe, Simon & Schuster, UK Ltd., London.